Dual-band in situ molecular spectroscopy using single-sized Al-disk perfect absorbers

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Optimization of the Al disk and insulator thicknesses. Fig. S1a presents the simulated absorptivity spectra of DPAs having the same $p = 3.0\,\mu m$, $d = 2.55\,\mu m$, $t = 0.15\,\mu m$ but different Al disk thicknesses. Both resonances of the DPAs slightly red-shift when the Al disk thickness increases. Based on this simulation, we chose Al disk thickness at 0.1 µm for all DPAs. Fig. S1b reveals the simulated dependence of DPA's absorptivity on the insulator thickness with $p = 3.0\,\mu m$, $d = 2.55\,\mu m$, and the Al disk thickness of 0.1 µm. Based on several simulations with different disk diameters, the optimal insulator thickness for the 3.0-µm periodicity DPAs was found to be 0.15 µm.
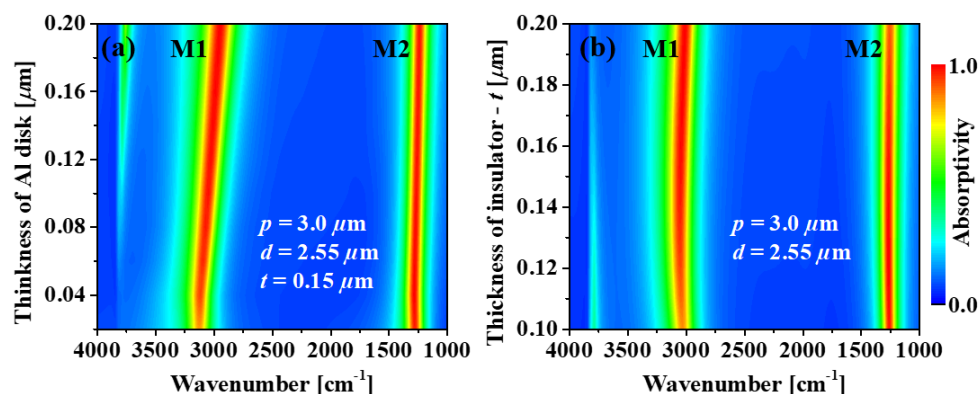

Fig. S1. (a) Simulated dependence of the DPA's absorptivity on the Al disk thickness. (b) Simulated dependence of the DPA's absorptivity on the insulator thickness. In both simulations, the periodicity and the disk diameter were $p = 3.0$ µm, $d = 2.55$ µm and $t = 0.15$ µm for (a); Al disk thickness chosen at 0.1 µm for (b); the excited electromagnetic field propagated along the -Z-direction at normal incidence; the incident electric field oscillated along the X-axis; absorptivity spectra were taken at normal angle.

Surface plasmon polaritons (SPPs) in the plasmonic hexagonal lattice. In the hexagonal

metal lattice, SPPs at the metal-air interface can couple to the incident photon and photonic

lattice when SPPs' momentum $\left|\vec{k}_{spp}\right| = k_0 \sqrt{\dfrac{\varepsilon_m}{\varepsilon_m + 1}}$ (ε_m is the complex permittivity of the metal,

$k_0 = \dfrac{2\pi}{\lambda}$) matches the total momentum of the incident photon and photonic lattice (momentum

conservation):

$$\left|\vec{k}_{spp}\right| = \left|\vec{k}_{\parallel} + i\vec{G}_x + j\vec{G}_y\right| \tag{1}$$

where $\left|\vec{k}_{\parallel}\right| = k_0 \sin\theta$ is the projection of momentum of the excitation photon with an incident

angle of θ on the metal surface, $\vec{G}_x$ and $\vec{G}_y$ are two primitive lattice vectors, i and j are

integers. With an azimuthal angle of $0°$, as $\vec{k}_{\parallel}$ is oriented along the $\left(\vec{G}_x + \vec{G}_y\right)$ direction (the

angle between two primitive vectors is $60°$, see Fig. 1a in the manuscript), $\vec{k}_{\parallel}$ of the incident

photon momentum can be written as:

$$\vec{k}_{\parallel} = \frac{\left|\vec{k}_{\parallel}\right|}{2\cos 30°} \frac{\vec{G}_x}{\left|\vec{G}_x\right|} + \frac{\left|\vec{k}_{\parallel}\right|}{2\cos 30°} \frac{\vec{G}_y}{\left|\vec{G}_y\right|} \tag{2}$$

The momentum conservation is now given by:

$$\left|\vec{k}_{spp}\right| = \left|\left(\frac{k_0 \sin\theta}{2\cos 30°} \frac{\vec{G}_x}{\left|\vec{G}_x\right|} + i\vec{G}_x\right) + \left(\frac{k_0 \sin\theta}{2\cos 30°} \frac{\vec{G}_y}{\left|\vec{G}_y\right|} + j\vec{G}_y\right)\right| \tag{3}$$

$$\left|\vec{k}_{spp}\right|^2 = \left(k_0\sqrt{\frac{\varepsilon_m}{\varepsilon_m+1}}\right)^2 = \left(\frac{k_0\sin\theta}{\sqrt{3}}\frac{\vec{G}_x}{\left|\vec{G}_x\right|}+i\vec{G}_x\right)^2 + \left(\frac{k_0\sin\theta}{\sqrt{3}}\frac{\vec{G}_y}{\left|\vec{G}_y\right|}+j\vec{G}_y\right)^2 +$$

$$+2\cos 60°\left(\frac{k_0\sin\theta}{\sqrt{3}}\frac{\vec{G}_x}{\left|\vec{G}_x\right|}+i\vec{G}_x\right)\left(\frac{k_0\sin\theta}{\sqrt{3}}\frac{\vec{G}_y}{\left|\vec{G}_y\right|}+j\vec{G}_y\right)$$

(4)

Here $\left|\vec{G}_x\right| = \left|\vec{G}_y\right| = \frac{4\pi}{\sqrt{3}p}$, $k_0 = \frac{2\pi}{\lambda}$, the angular dependent dispersion relation for an plasmonic

hexagonal lattice along the $\vec{G}_x + \vec{G}_y$ is finally expressed as a function of incident angle and

integers i, j:

$$\frac{\varepsilon_m}{\varepsilon_m+1} = \sin^2\theta + \frac{2}{p}(i+j)\lambda\sin\theta + \frac{4}{3p^2}(i^2+ij+j^2)\lambda^2$$

(5)

At normal incidence, the resonant wavelength is simply calculated as:

$$\lambda_{spp} = \frac{\sqrt{3}p}{2\sqrt{(i^2+ij+j^2)}}\sqrt{\frac{\varepsilon_m}{\varepsilon_m+1}}$$

(6)

Coupling between SPP (-1,0) and the third-order magnetic resonance. The resonance (in

wavelength) of DPAs can be treated as a function of the geometrical parameters using the half-

wave dipole antenna model $\lambda_m = \frac{2}{m}\sqrt{\varepsilon_{eff}}d + C$, where λ_m is the resonance at the m-order, ε_{eff}

is the effective dielectric function of the antenna insulator, d is the disk diameter, and C is a

constant. In the periodic circular antenna array, ε_{eff} can be treated as a function of periodicity

$- p$, insulator thickness $- t$, the dielectric functions of the insulator layer $- \varepsilon_d$ and the metal

film ε_m ($1 < \varepsilon_{eff} < \varepsilon_d$). Based on the simulated dependence of DPA resonance on the Al disk

diameter, the dependence of the third-order magnetic resonance on the disk diameter is found

to be $\lambda_3 = 0.9876d + 0.7333$ ($\varepsilon_{eff} = 1.481$) (dashed white line in Fig. S2d).

The simple Hamiltonian described the coupling between the third-order magnetic resonance

energy ($\hbar\omega_3 = \dfrac{hc}{\lambda_3}$) and the SPP (-1,0) resonance energy ($\hbar\omega_{spp} = \dfrac{hc}{\lambda_{spp}}$) can be written as:

$\hbar\begin{pmatrix} \omega_3 & g_C \\ g_C & \omega_{spp} \end{pmatrix}$, where g_C is the coupling constant. The eigenvalues of this Hamiltonian are:

$E_C^{(\pm)} = \dfrac{1}{2}\hbar\left(\omega_3 + \omega_{spp}\right) \pm \dfrac{1}{2}\hbar\sqrt{\left(\omega_3 - \omega_{spp}\right)^2 + 4g_C^2}$. With the coupling strength energy $-\hbar g_C$ of 28

meV estimated from the simulation of the diameter-dependent resonance (Fig. S2c), we plotted

the polaritonic hybridized energies $E_C^{(-)}$ (brown solid curve) and $E_C^{(+)}$ (violet solid curve)

shown in Fig. S2d. It is clear to see the mode coupling and energy splitting behavior (Rabi

energy splitting of 56 meV) of M1 resulted from the coupling between the third-order magnetic

resonance and the SPP (-1,0) mode.
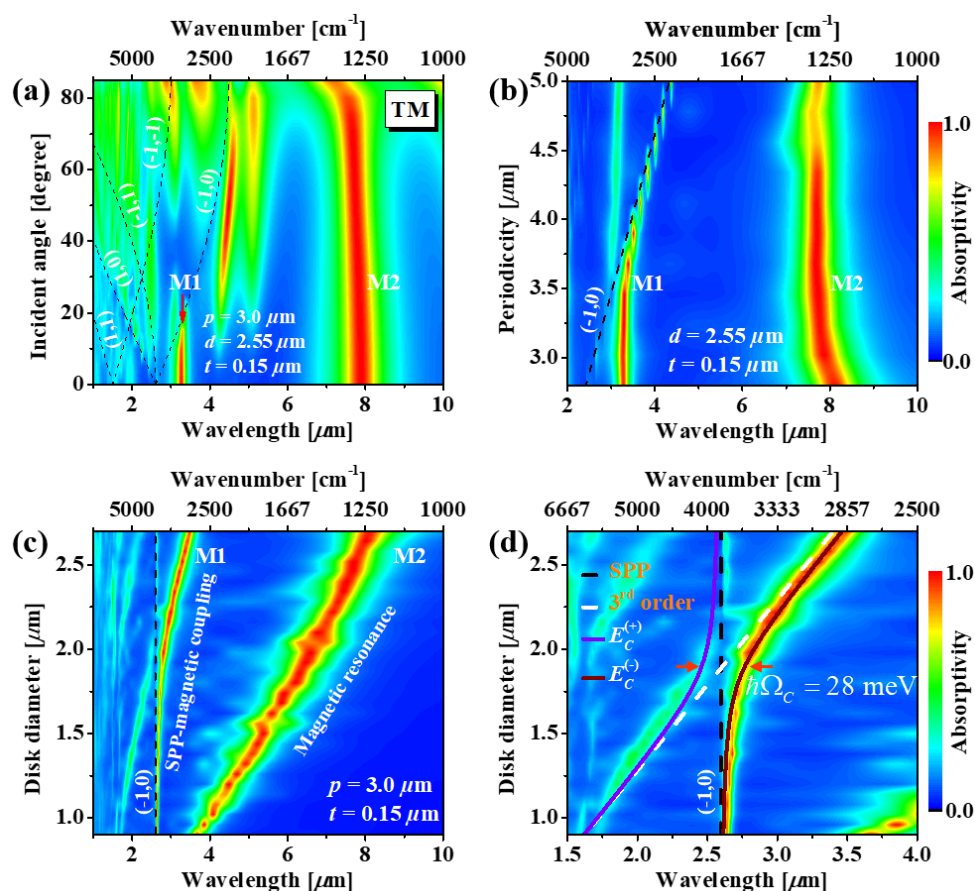
Fig. S2. (a) Simulated angle-dependent DPA's absorptivity. (b) Simulated dependence of DPA's absorptivity on the periodicity. The same geometrical parameters of DPA were chosen for (a) and (b) with $p = 3.0$ µm, $d = 2.55$ µm and $t = 0.15$ µm. (c) The simulated dependence of DPA absorptivity on the disk diameter (replotted Fig. 1c in the wavelength scale) (with $d = 2.55$ µm and $t = 0.15$ µm). (d) Replotted (c) from1.5 µm – 4.0 µm wavelength range to reveal the coupling between the SPP (-1,0) mode and the third-order magnetic resonance. Dashed black curves represent SPPs in the Al hexagonal lattice following equation (5). Dashed white line in (d) represents the linear relation between the third-order magnetic resonance and the Al disk diameter. Solid curves in (d) denotes hybridized modes between the SPP (-1,0) and the third-order magnetic resonance. In the simulations, the excited electromagnetic field propagated along the -Z-direction at normal incidence; the incident electric field oscillated along the X-axis; absorptivity spectra were taken at normal angle for the disk-diameter dependence and periodicity dependence simulations.

Electric field (E_x and E_z) distributions taken in *X-Y* plane.
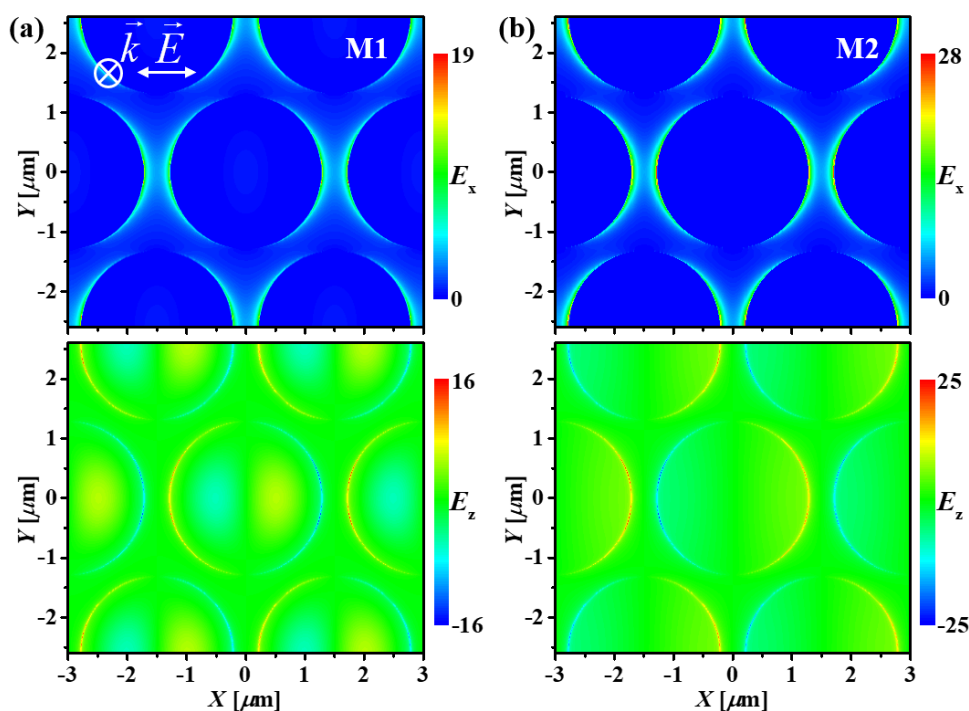
Fig. S3. Simulated electric field (E_x and E_z) distributions in the *X-Y* plane taken at the interface between the Al disks array and Al_2O_3 film: (a) Excited at M1 and (b) Excited at M2. In the simulations, the excited electromagnetic field propagated along the -Z-direction at normal incidence; the incident electric field oscillated along the *X*-axis; the incident fields amplitudes were normalized to 1.

Polarization-independent absorptivity of DPAs.
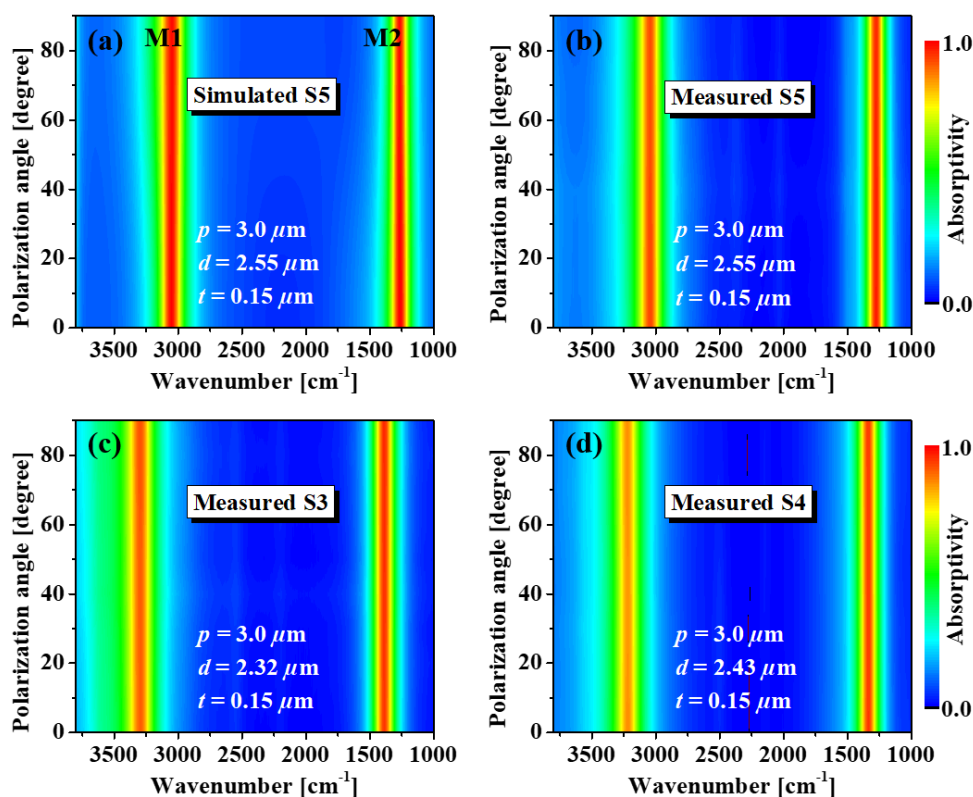
Fig. S4. (a) Simulated and (b) Measured polarization-independent absorptivity of DPA-S5 with the geometrical parameters of p = 3.0 µm, d = 2.55 µm, t = 0.15 µm. Measured polarization-independent absorptivity maps: (c) S3 and (d) S4.

Spectroscopic ellipsometry of PDMS film. A 10:1 (volume) mixture of the elastomer base and curing agent from a PDMS silicone elastomer kit (SYLGARD® 184, Sigma-Aldrich) was diluted in *n*-heptane with different volume ratios. The diluted mixtures in *n*-heptane solutions with different ratios were then spin-coated onto 1×1 Si (100) wafers at 6000 rpm for 60 seconds. After spin-coating, the mixture films were kept in ambient for 2 hours to allow the mixture films smoothly form on the Si substrates. Subsequently, the films were cured at 100 °C for 45 minutes to uniformly form PDMS elastomer, and then naturally cooled to room temperature. The thicknesses of the PDMS films formed at different PDMS:*n*-heptane volume

ratio were also obtained using ellipsometry in the UV – NIR range with a Tauc-Lorentz fitting model (the inset in Fig. S5b), which is almost proportional to the PDMS:*n*-heptane volume ratio. To get the optical properties of the PDMS film from the UV to MIR region, a sub-300 nm PDMS film coated on a Si substrate was measured in the range of 50000 cm^{-1} – 400 cm^{-1} (0.2 μm – 25 μm) using two spectroscopic ellipsometers (SENTECH, SE 850 DUV for UV – NIR region and SENDIRA for MIR region). Together with a Tauc-Lorentz model used in the UV – NIR region, a Brendel multi-oscillator model with 11 oscillators was employed to simulate the molecular vibrations of the PDMS film in the MIR region. As seen in Fig. S5a and Fig. S5b, the models used in the fitting are in good agreement with the measured amplitude change (Ψ) and the phase change (Δ).
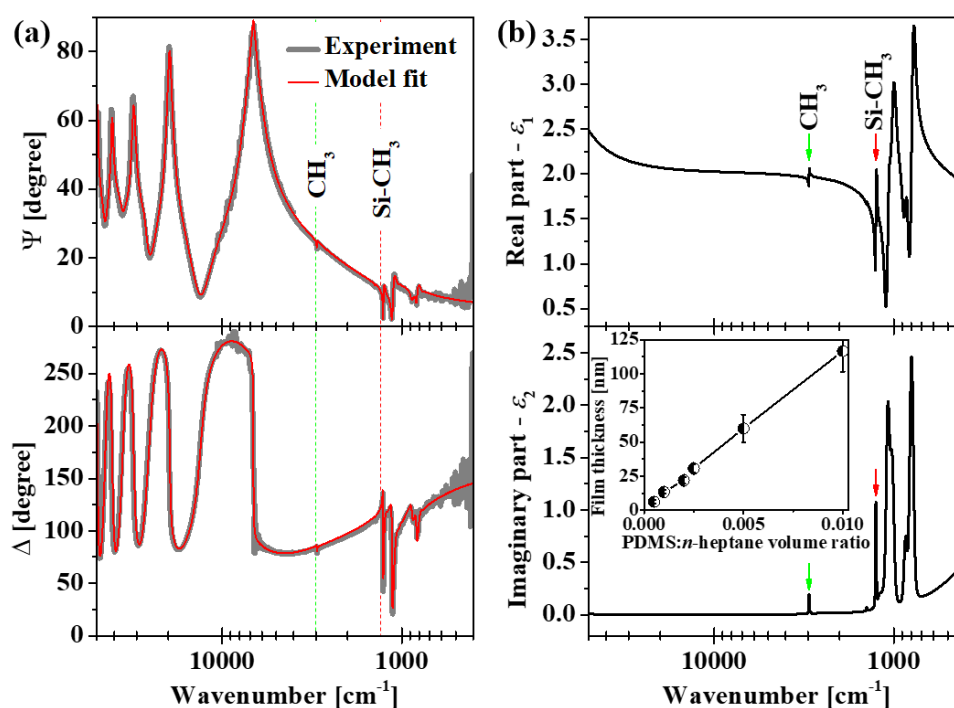
Fig. S5. Spectroscopic ellipsometry of the PDMS thin films. (a) The relative amplitude change (Ψ) and the phase change (Δ) of the PDMS films measured with two ellipsometric angles (gray curves). Red curves show the fitting results. (b) Retrieved permittivity of the PDMS. The inset in (b) shows the thickness dependence of the PDMS thin film on the PDMS:*n*-heptane volume ratio.

SEIRA enhancement factor of DPA. The SEIRA enhancement factor of DPA-S5 was

calculated as: $EF = \dfrac{I_{SEIRA}}{I_{bulk}} \dfrac{N_{bulk}}{N_{SEIRA}}$, where I_{SEIRA} and I_{bulk} are intensities of the molecular

vibration mode from a 10-nm PDMS layer coated on DPA-S5 (for SEIRA) and from a 450-

nm PDMS film coated on an Al film, respectively. N_{bulk} and N_{SEIRA} are the number of PDMS

molecules contributed to vibrational signals of a 450-nm PDMS film coated on the Al film and

the SEIRA signal on DPA-S5, respectively. N_{bulk} can be expressed as: $N_{bulk} = At_{PDMS}n$, where

A is the IR beam area, t_{PDMS} is the bulk PDMS thickness ($t_{PDMS} = 450$ nm), and n is the

molecular number density.
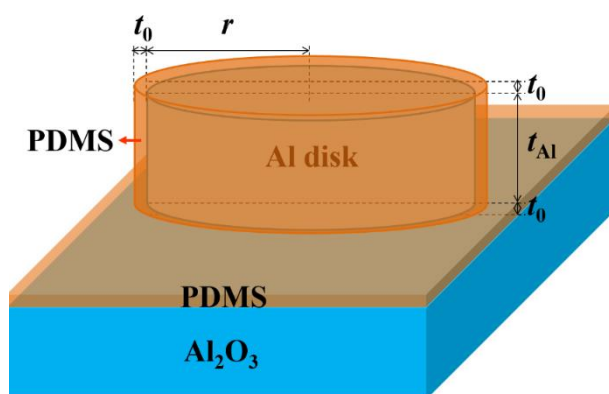
Fig. S6. Schematic illustration of 10 nm PDMS coated on DPA.

N_{SEIRA} can be estimated by the number of molecules from the PDMS film with 10-nm-thick

toroidal volumes around Al disks with respect to the hot-spot volume of each Al disk antenna

(see Fig. S6): $N_{SEIRA} = \left\{ \pi \left[\left(r + t_0 \right)^2 - r^2 \right] \left(t_{Al} + t_0 \right) \right\} \left[\dfrac{\dfrac{\pi\sqrt{3}}{6} A}{\pi \left(\dfrac{p}{2} \right)^2} \right] n$, where r is the Al disk diameter

of DPA-S5 ($r = 1275$ nm), t_{Al} is the Al disk thickness ($t_{Al} = 100$ nm), t_0 is the PDMS thickness

coated on DPA-S5 (t_0 = 10 nm), $\dfrac{\pi\sqrt{3}}{6}$ is the filling factor of the 2D closed-package hexagonal

lattice, p is the periodicity of DPA-S5 (p = 3000 nm). Here the first factor –

$\left\{\pi\left[\left(r+t_0\right)^2 - r^2\right]\left(t_{Al}+t_0\right)\right\}$ is the toroidal volume of PDMS molecule on each Al disk, and

the second factor – $\left[\dfrac{\dfrac{\pi\sqrt{3}}{6}A}{\pi\left(\dfrac{p}{2}\right)^2}\right]$ is the number of Al disks in the IR beam area. Thus, the ratio

$\dfrac{N_{bulk}}{N_{SEIRA}}$ is given by:

$$\frac{N_{bulk}}{N_{SEIRA}} = \frac{At_{PDMS}n}{\left\{\pi\left[\left(r+t_0\right)^2 - r^2\right]\left(t_{Al}+t_0\right)\right\}\left[\dfrac{\dfrac{\pi\sqrt{3}}{6}A}{\pi\left(\dfrac{p}{2}\right)^2}\right]n} = \frac{6t_{PDMS}\left(\dfrac{p}{2}\right)^2}{\pi\sqrt{3}\left[\left(r+t_0\right)^2 - r^2\right]\left(t_{Al}+t_0\right)} = 396 \quad .$$

Finally, the enhancement factors for each resonance mode were calculated as high as 571 at

M1 and 642 at M2.

Further analysis of curing dynamics of PDMS by SEIRA. Here we assume the

conformational changes at the C-H stretching and the CH_3 deformation of PDMS elastomer

were proportional to the absorbance reduction of the crosslinker's S-H stretching during the

hydrosilylation reaction. The conversions – α can be therefore predicted by the following

equation: $\alpha_t = \dfrac{\log_{10}\left(R_t/R_0\right)}{\log_{10}\left(R_S/R_0\right)}$, where R_S/R_0 is the saturated SEIRA reflectance. Fig. S7 plots

the degrees of the conversions at the conformational changes of both C-H and $Si\text{-}CH_3$

vibrations as functions of the reaction times. In addition, the kinetic of the reaction can be

expressed by: $\dfrac{d\alpha}{dt} = K_0 \exp\left(\dfrac{-E_a}{RT}\right) f(\alpha) = Kf(\alpha)$, where t is the reaction time, K_0 is the

preexponential factor or Arrhenius frequency factor, E_a is the activation energy, R is the

universal gas constant, T is the absolute temperature, $f(\alpha)$ is the reaction model, and

$K = K_0 \exp\left(\dfrac{-E_a}{RT}\right)$ is the rate constant following the Arrhenius equation. For the curing

kinetics, the nth-order model can be applied: $\dfrac{d\alpha}{dt} = K(1-\alpha)^n$, where n is the order of the

kinetic. By fitting the degrees of conversions using the above reaction rate equation (solid lines

in Fig. S7), we obtained the Arrhenius frequency factor of 0.285 hour^{-1}, the activation energy

of 2.074 kJ·mol^{-1} with the order – n of the kinetic of 0.44.
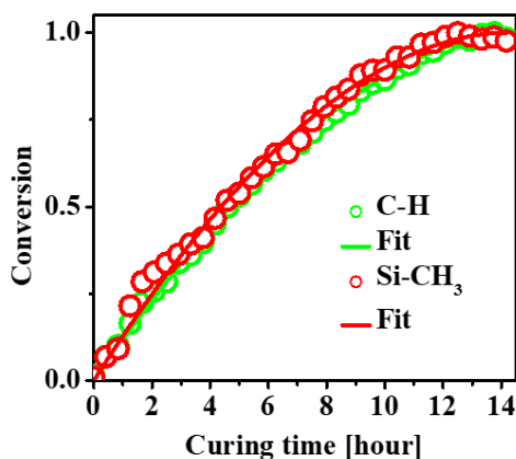
Fig. S7. (a) Degrees of conversions versus curing times. Solid lines represent the fitted kinetic curves.

Angle-resolved SEIRA spectroscopy. Angle-resolved measurements on DPA-S5 and its SEIRA spectroscopy with a 10-nm PDMS layer was also carried out (Fig. S8a – Fig. S8c). The measured angle-dependent absorptivity agrees well with the simulation result shown in Fig. S2a. The angle-dependent absorptivity of DPA-S5 targeting at the magnetic resonance – M2 are re-plotted in Fig. S8b and their SEIRA spectra with a 10-nm PDMS are presented in Fig. S8c.
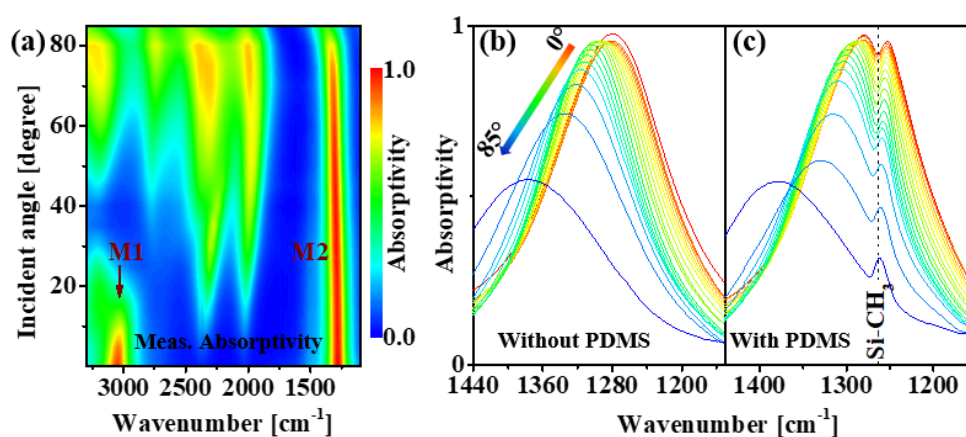
Fig. S8. (a) Measured spectral map of the angle-dependent absorptivity of DPA-S5. M2 is almost unchanged up to 80° of incidence while M1 strongly depends on the incidence angle up to 15°. (b) Replotted angle-resolved absorptivity spectra at M1 and (c) Angle-resolved SEIRA spectra at M1 with 10-nm PDMS film.

Detailed information of samples S6 and S7. To fully investigate the coupling between Si-CH$_3$ vibration and DPAs, two additional DPAs named sample S6 and sample S7 were designed and fabricated (Fig. S9). Both S6 and S7 have the same periodicity (4.4 µm) and the insulator thickness (0.2 µm) but different diameters to have different magnetic resonances at 1260 cm^{-1} (d = 2.97 µm, S6) and at 1130 cm^{-1} (d = 3.28 µm, S7). We also observed the SPP coupled magnetic (third order) resonances of S6 and S7 at around 2500 cm^{-1} with absorptivities of 0.67 (S6) and 0.83 (S7).
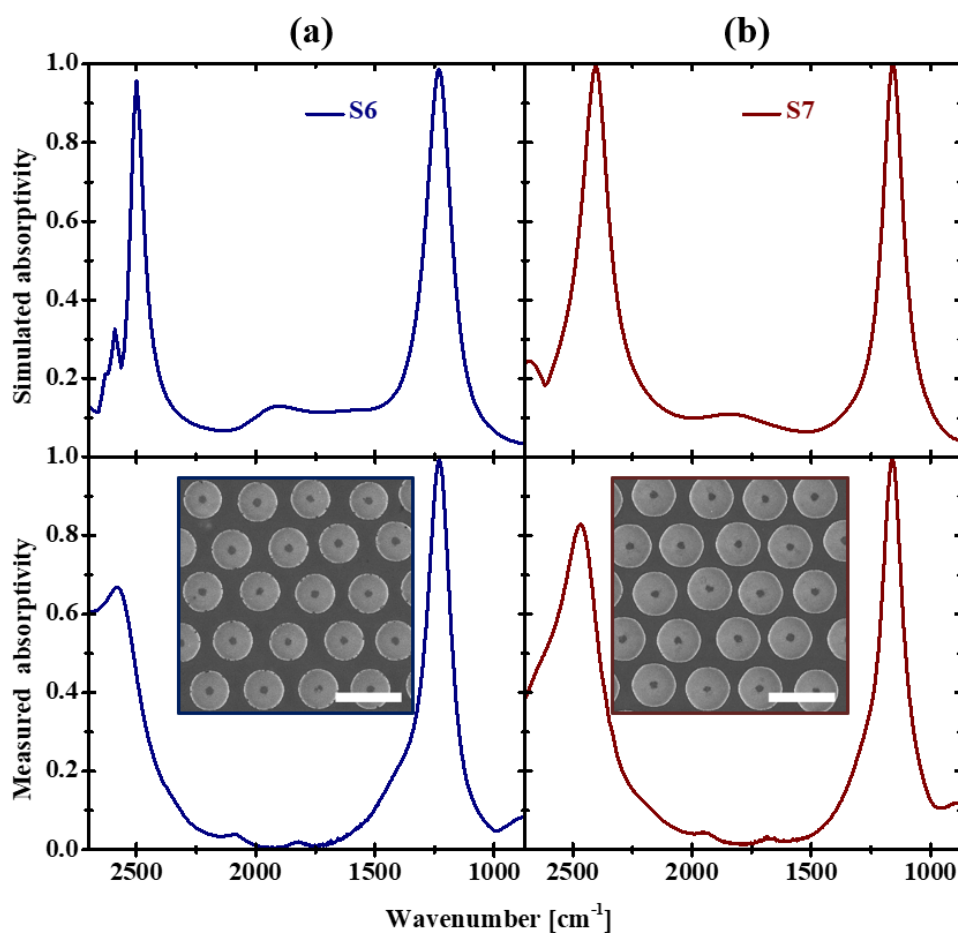
Fig. S9. Simulated and measured absorptivities of two samples: (a) S6 (d = 2.97 µm) and (b) S7 (d = 3.28 µm) with the same periodicity (4.4 µm) and insulator thickness (0.2 µm). The scale bars used in the SEM images represent 5 µm.

Further SEIRA spectra of C-H stretching and its hybridization with M1 resonance.

Together with SEIRA study of a 10-nm PDMS film coated on all DPAs (S1 – S7) at the fundamental magnetic resonance – M2, SEIRA spectra and the coupling between C-H stretching vibration with the SPP coupled magnetic (third order) resonance – M1 were also analyzed (Fig. S10).
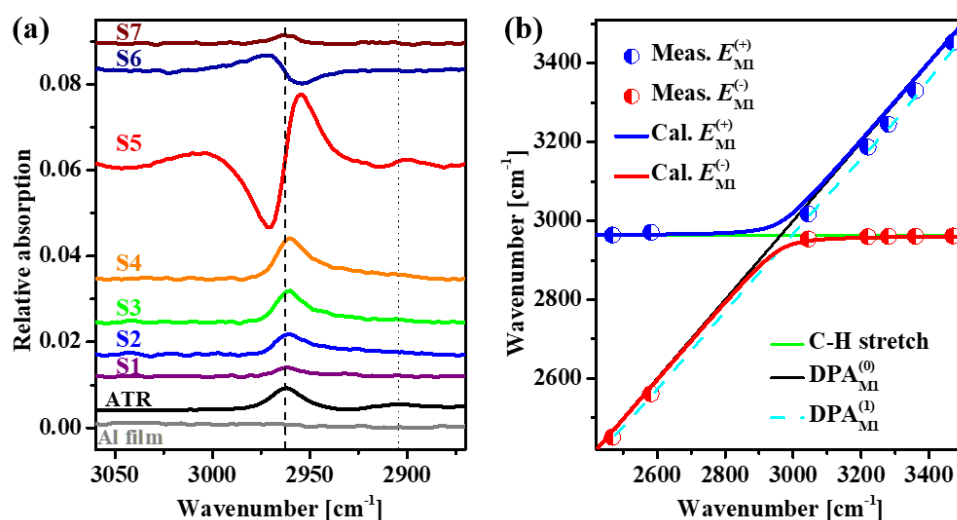
Fig. S10. (a) Relative absorption spectra of asymmetric C-H stretching in CH_3 taken from 10-nm PDMS films coated on DPAs, and on Al films measured in both standard reflectance and ATR geometries. (b) Hybridized modes (half-filled circles) resulted from the coupling between the C-H stretching in CH_3 and M1 of the DPAs plotted against the bare M1 resonances (black line with slope = 1) and C-H stretching in CH_3 at 2962 cm^{-1} (green line). The dashed cyan line denotes M1 resonances with a redshift caused by the presence of the PDMS film. Blue and red curves denote the calculated hybridized modes.

Table S1. Complex permittivity of PDMS film retrieved from spectroscopic ellipsometry

Wavenumber [cm^{-1}]	Real part (ε_1)	Imaginary part (ε_2)
50000	2.48471	0.00831
47079.60502	2.41198	0.00598
44481.53018	2.3561	0.00433
42155.20865	2.312	0.00313
40060.12063	2.27643	0.00224
38163.4205	2.24724	0.00158
36438.20616	2.22291	0.00108
34862.22553	2.20239	7.00E-04
33416.91796	2.1849	4.30E-04
32086.67715	2.16984	2.40E-04
30858.28969	2.15677	1.10E-04
29720.48802	2.14535	3.00E-05
28663.60746	2.13532	0
27679.31323	2.12648	0
26760.37508	2.11863	0
25900.49212	2.11162	0
25094.15011	2.10533	0
24336.49882	2.09966	1.00E-05
23623.25668	2.09453	1.00E-05
22950.6314	2.08987	1.00E-05
22315.24904	2.08562	1.00E-05
21714.09927	2.08173	1.00E-05
21144.48903	2.07817	1.00E-05
20603.99923	2.07489	1.00E-05
20090.45244	2.07187	1.00E-05
19601.88263	2.06907	1.00E-05
19136.51161	2.06648	1.00E-05
18692.72502	2.06407	1.00E-05
18269.05491	2.06183	1.00E-05
17864.16443	2.05974	1.00E-05

17476.83171	2.05778	1.00E-05
17105.93862	2.05595	2.00E-05
16750.46085	2.05423	2.00E-05
16409.45664	2.05262	2.00E-05
16082.05942	2.0511	2.00E-05
15767.47117	2.04966	2.00E-05
15464.9544	2.04831	2.00E-05
15173.82735	2.04703	2.00E-05
14893.45845	2.04582	2.00E-05
14623.26264	2.04467	3.00E-05
14362.69587	2.04357	3.00E-05
14111.25224	2.04253	3.00E-05
13868.46122	2.04154	3.00E-05
13633.88357	2.0406	3.00E-05
13407.10926	2.0397	3.00E-05
13187.75563	2.03883	3.00E-05
12975.46415	2.03801	4.00E-05
12769.899	2.03722	4.00E-05
12570.7458	2.03646	4.00E-05
12377.70901	2.03573	4.00E-05
12190.51096	2.03503	4.00E-05
12008.891	2.03435	5.00E-05
11832.60331	2.0337	5.00E-05
11661.41646	2.03307	5.00E-05
11495.1121	2.03247	5.00E-05
11333.48453	2.03188	5.00E-05
11176.33908	2.03132	6.00E-05
11023.49174	2.03077	6.00E-05
10874.76879	2.03024	6.00E-05
10730.0054	2.02972	6.00E-05
10589.04541	2.02922	7.00E-05
10451.74108	2.02873	7.00E-05
10317.95192	2.02826	7.00E-05

10187.54455	2.0278	7.00E-05
10060.39254	2.02735	8.00E-05
9936.3754	2.02691	8.00E-05
9815.37862	2.02648	8.00E-05
9697.29308	2.02607	9.00E-05
9582.01516	2.02566	9.00E-05
9469.4458	2.02526	9.00E-05
9359.49056	2.02486	1.00E-04
9252.05961	2.02448	1.00E-04
9147.06693	2.0241	1.00E-04
9044.43034	2.02374	1.10E-04
8944.07158	2.02337	1.10E-04
8845.91559	2.02302	1.10E-04
8749.89054	2.02267	1.20E-04
8655.92794	2.02232	1.20E-04
8563.96197	2.02198	1.30E-04
8473.9296	2.02165	1.30E-04
8385.77061	2.02132	1.30E-04
8299.42706	2.02099	1.40E-04
8214.84346	2.02067	1.40E-04
8131.96646	2.02035	1.50E-04
8050.74507	2.02004	1.50E-04
7971.1301	2.01973	1.60E-04
7893.07429	2.01942	1.60E-04
7816.53241	2.01912	1.70E-04
7741.46079	2.01882	1.70E-04
7667.81739	2.01852	1.70E-04
7595.56197	2.01822	1.80E-04
7524.65559	2.01793	1.90E-04
7455.06076	2.01764	1.90E-04
7386.74155	2.01735	2.00E-04
7319.66314	2.01706	2.00E-04
7253.79203	2.01678	2.10E-04

7189.09587	2.01649	2.10E-04
7125.5436	2.01621	2.20E-04
7063.1051	2.01593	2.20E-04
7001.7513	2.01565	2.30E-04
6941.45427	2.01537	2.40E-04
6882.18689	2.0151	2.40E-04
6823.92297	2.01482	2.50E-04
6766.63733	2.01454	2.60E-04
6710.30548	2.01427	2.60E-04
6654.90377	2.014	2.70E-04
6600.40942	2.01372	2.80E-04
6546.8003	2.01345	2.80E-04
6494.05499	2.01318	2.90E-04
6442.15275	2.01291	3.00E-04
6391.0736	2.01264	3.10E-04
6340.79809	2.01237	3.10E-04
6291.30735	2.01209	3.20E-04
6242.58323	2.01182	3.30E-04
6194.60801	2.01155	3.40E-04
6147.36452	2.01128	3.40E-04
6100.83623	2.01101	3.50E-04
6055.00698	2.01074	3.60E-04
6009.86109	2.01047	3.70E-04
5965.38346	2.0102	3.80E-04
5921.55934	2.00992	3.90E-04
5878.37439	2.00965	4.00E-04
5835.81479	2.00938	4.10E-04
5793.86703	2.00911	4.20E-04
5752.518	2.00883	4.20E-04
5711.75495	2.00856	4.30E-04
5671.56557	2.00828	4.40E-04
5631.9378	2.008	4.50E-04
5592.85993	2.00773	4.60E-04

5554.32064	2.00745	4.80E-04
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5441.82501	2.00661	5.10E-04
5405.33233	2.00633	5.20E-04
5369.3258	2.00605	5.30E-04
5333.79582	2.00576	5.40E-04
5298.73297	2.00548	5.60E-04
5264.1281	2.00519	5.70E-04
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5196.25683	2.00461	5.90E-04
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5130.11343	2.00403	6.20E-04
5097.6692	2.00374	6.30E-04
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5033.99647	2.00315	6.60E-04
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4971.89475	2.00255	6.90E-04
4941.41493	2.00225	7.10E-04
4911.30657	2.00194	7.20E-04
4881.56289	2.00164	7.40E-04
4852.17728	2.00133	7.60E-04
4823.14336	2.00102	7.80E-04
4794.45484	2.00071	7.90E-04
4766.10558	2.0004	8.10E-04
4738.08959	2.00008	8.30E-04
4710.40106	1.99977	8.50E-04
4683.03426	1.99945	8.70E-04
4655.9836	1.99913	8.90E-04
4629.24367	1.9988	9.10E-04
4602.80912	1.99848	9.40E-04
4576.67475	1.99815	9.60E-04
4550.83549	1.99782	9.80E-04

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3948.87599	1.9879	0.00221
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2731.24743	1.96716	0.0135
2722.02402	1.96644	0.01357
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2502.3158	1.9524	0.01534
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2398.09017	1.94544	0.01602
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2383.90536	1.94443	0.01612
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2362.94002	1.94289	0.01626
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2269.7854	1.93551	0.01688
2263.41176	1.93496	0.01692
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2219.77924	1.93108	0.01719
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2177.79714	1.92706	0.01743
2171.92899	1.92647	0.01746
2166.09237	1.92587	0.01749
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2076.79681	1.91588	0.01797
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2014.51174	1.90769	0.01834
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1999.51988	1.90554	0.01844
1994.57205	1.90481	0.01848
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1984.7495	1.90335	0.01855
1979.87441	1.90261	0.01858
1975.02322	1.90187	0.01862

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1955.85386	1.89885	0.01877
1951.11953	1.89809	0.01881
1946.40806	1.89732	0.01885
1941.71928	1.89654	0.01889
1937.05304	1.89576	0.01893
1932.40918	1.89498	0.01897
1927.78753	1.89419	0.01902
1923.18793	1.8934	0.01906
1918.61023	1.8926	0.0191
1914.05427	1.89179	0.01915
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1874.00394	1.88434	0.01958
1869.65712	1.88349	0.01963
1865.33042	1.88263	0.01968
1861.0237	1.88176	0.01974
1856.73682	1.88089	0.01979
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1843.99387	1.87826	0.01995
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1782.81576	1.86431	0.02086
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1763.31528	1.85936	0.0212
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1755.63401	1.85734	0.02134
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1621.43309	1.81317	0.02456
1618.17799	1.81183	0.02466
1614.93594	1.81049	0.02476
1611.70685	1.80913	0.02487
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1589.45979	1.79932	0.02563

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1375.22531	1.63417	0.04199
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1363.59296	1.61423	0.04413
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1358.99493	1.60591	0.04509
1356.70752	1.60164	0.04559
1354.42781	1.5973	0.04611
1352.15574	1.59287	0.04664
1349.89128	1.58834	0.0472
1347.63439	1.58373	0.04777
1345.38504	1.579	0.04836
1343.14318	1.57417	0.04898
1340.90879	1.56921	0.04962
1338.68181	1.56413	0.05028
1336.46222	1.55891	0.05096
1334.24998	1.55354	0.05167
1332.04505	1.54801	0.05241
1329.84739	1.54231	0.05318

1327.65697	1.53643	0.05398
1325.47376	1.53035	0.05481
1323.29772	1.52406	0.05568
1321.12881	1.51753	0.05658
1318.967	1.51074	0.05753
1316.81225	1.50368	0.05852
1314.66453	1.49631	0.05956
1312.5238	1.48859	0.06064
1310.39004	1.4805	0.06179
1308.2632	1.47198	0.063
1306.14325	1.46298	0.06427
1304.03016	1.45344	0.06563
1301.9239	1.44329	0.06707
1299.82444	1.43242	0.06862
1297.73173	1.42073	0.07029
1295.64575	1.40807	0.07211
1293.56646	1.39426	0.07412
1291.49384	1.37907	0.07638
1289.42785	1.36219	0.07896
1287.36846	1.34322	0.08201
1285.31564	1.32163	0.08574
1283.26935	1.29668	0.0905
1281.22957	1.26736	0.09692
1279.19626	1.23228	0.10616
1277.1694	1.18964	0.12035
1275.14895	1.1375	0.14359
1273.13488	1.07512	0.18337
1271.12716	1.00725	0.25117
1269.12577	0.95032	0.35635
1267.13067	0.92616	0.49168
1265.14183	0.9406	0.64202
1263.15922	1.00402	0.80539
1261.18282	1.13767	0.94931

1259.2126	1.31261	1.03882
1257.24852	1.51695	1.07106
1255.29056	1.7124	1.02502
1253.33868	1.87883	0.92722
1251.39287	1.99328	0.77986
1249.45309	2.0416	0.62707
1247.51932	2.04813	0.48782
1245.59152	2.01775	0.36492
1243.66967	1.95949	0.27339
1241.75374	1.89408	0.21633
1239.8437	1.83469	0.18409
1237.93953	1.78472	0.16658
1236.04121	1.74337	0.15736
1234.14869	1.70889	0.15284
1232.26196	1.6797	0.15109
1230.38099	1.65457	0.15107
1228.50576	1.63261	0.15221
1226.63623	1.61315	0.15415
1224.77238	1.59574	0.1567
1222.91419	1.58003	0.15969
1221.06163	1.56578	0.16303
1219.21468	1.55278	0.16662
1217.3733	1.54088	0.17039
1215.53748	1.52996	0.17429
1213.70718	1.51991	0.17824
1211.88239	1.51068	0.18219
1210.06308	1.50218	0.18607
1208.24922	1.49433	0.18978
1206.44079	1.48704	0.19326
1204.63776	1.48021	0.19646
1202.84012	1.47374	0.19935
1201.04784	1.46753	0.20189
1199.26089	1.4615	0.20406

1197.47924	1.45552	0.20585
1195.70289	1.44951	0.20728
1193.93179	1.44338	0.20838
1192.16594	1.43706	0.20919
1190.4053	1.43048	0.20974
1188.64985	1.42358	0.21009
1186.89957	1.41631	0.21031
1185.15444	1.40864	0.21046
1183.41444	1.40058	0.21061
1181.67953	1.39213	0.21078
1179.94971	1.38328	0.21102
1178.22494	1.37403	0.21136
1176.50521	1.36438	0.21183
1174.79049	1.35434	0.21246
1173.08076	1.34391	0.21328
1171.376	1.3331	0.21431
1169.67619	1.32193	0.21556
1167.9813	1.31039	0.21703
1166.29132	1.29849	0.21872
1164.60622	1.28621	0.22064
1162.92599	1.27354	0.22278
1161.2506	1.26045	0.22517
1159.58002	1.24691	0.2278
1157.91425	1.2329	0.23071
1156.25325	1.21838	0.2339
1154.59702	1.20332	0.23741
1152.94552	1.18769	0.24127
1151.29874	1.17144	0.24553
1149.65666	1.15454	0.25022
1148.01925	1.13696	0.2554
1146.3865	1.11866	0.26114
1144.75839	1.09959	0.2675
1143.1349	1.07973	0.27457

1141.51601	1.05903	0.28243
1139.90169	1.03747	0.29119
1138.29194	1.01503	0.30095
1136.68672	0.99168	0.31186
1135.08603	0.96742	0.32406
1133.48983	0.94225	0.3377
1131.89812	0.91619	0.35296
1130.31088	0.88927	0.37004
1128.72808	0.86157	0.38915
1127.1497	0.83319	0.4105
1125.57574	0.80425	0.43433
1124.00616	0.77494	0.46088
1122.44096	0.74548	0.49038
1120.88011	0.71616	0.52304
1119.32359	0.6873	0.55906
1117.77139	0.65931	0.59858
1116.22349	0.63261	0.6417
1114.67987	0.60768	0.68844
1113.14051	0.58499	0.73874
1111.6054	0.56504	0.79247
1110.07452	0.54828	0.8494
1108.54785	0.53513	0.90926
1107.02537	0.52596	0.9717
1105.50707	0.52108	1.03637
1103.99293	0.52078	1.10288
1102.48293	0.52528	1.17085
1100.97706	0.53482	1.23988
1099.47529	0.54962	1.30954
1097.97761	0.56991	1.37934
1096.48401	0.59587	1.44874
1094.99447	0.62763	1.5171
1093.50897	0.66521	1.58369
1092.02749	0.7085	1.64777

1090.55002	0.75722	1.7086
1089.07655	0.81096	1.76549
1087.60705	0.86921	1.81788
1086.14151	0.93137	1.8653
1084.67991	0.99684	1.90738
1083.22225	1.06501	1.94384
1081.76849	1.13525	1.97444
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1078.87266	1.27926	2.01741
1077.43055	1.35156	2.02965
1075.99229	1.42302	2.03585
1074.55787	1.4929	2.03631
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1068.85821	1.74546	1.98965
1067.44273	1.79988	1.96845
1066.03099	1.85029	1.94454
1064.62299	1.89655	1.9185
1063.2187	1.93861	1.89092
1061.81811	1.97652	1.86241
1060.4212	2.01044	1.83348
1059.02796	2.04062	1.80461
1057.63838	2.06732	1.77614
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1052.11634	2.14376	1.67125
1050.74483	2.15607	1.64849
1049.37688	2.16597	1.62779
1048.0125	2.17378	1.60957
1046.65166	2.17997	1.59427
1045.29435	2.18518	1.58221

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1042.59026	2.19579	1.5683
1041.24345	2.2029	1.56607
1039.90012	2.21219	1.56628
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1037.22383	2.23886	1.57084
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1031.91237	2.31993	1.57751
1030.59299	2.34363	1.57731
1029.27698	2.36837	1.57677
1027.96433	2.39448	1.57609
1026.65502	2.42249	1.57518
1025.34905	2.45301	1.57355
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1021.45098	2.55982	1.55416
1020.1582	2.59776	1.54004
1018.86869	2.63482	1.52211
1017.58244	2.67027	1.50123
1016.29943	2.704	1.47831
1015.01965	2.73635	1.45395
1013.74309	2.7678	1.42833
1012.46974	2.79874	1.40124
1011.19958	2.82927	1.37228
1009.9326	2.85921	1.34099
1008.6688	2.8881	1.30703
1007.40815	2.91532	1.27028
1006.15066	2.94019	1.23087
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996.20257	3.02294	0.88489
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993.74621	3.01849	0.80499
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986.44928	2.96996	0.58343
985.24353	2.95633	0.54921
984.04072	2.94104	0.51613
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974.52298	2.77681	0.30979
973.34619	2.75398	0.29196
972.17224	2.73124	0.27574
971.00112	2.70871	0.26102
969.83281	2.68648	0.24769
968.66732	2.66463	0.23562
967.50462	2.64321	0.22472
966.34471	2.62226	0.21487
965.18758	2.60181	0.20598
964.03322	2.58187	0.19795
962.88161	2.56245	0.19069

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959.44324	2.50725	0.17281
958.30257	2.48983	0.16794
957.16461	2.47287	0.16352
956.02935	2.45635	0.15951
954.89677	2.44026	0.15586
953.76688	2.42457	0.15254
952.63966	2.40926	0.14952
951.51509	2.39432	0.14677
950.39318	2.37972	0.14426
949.27392	2.36544	0.14197
948.15728	2.35146	0.13988
947.04327	2.33778	0.13798
945.93188	2.32435	0.13624
944.82309	2.31118	0.13465
943.71689	2.29824	0.13321
942.61329	2.28552	0.13189
941.51226	2.27301	0.13069
940.4138	2.26068	0.1296
939.3179	2.24852	0.12862
938.22455	2.23652	0.12773
937.13375	2.22466	0.12692
936.04548	2.21294	0.12621
934.95973	2.20134	0.12557
933.8765	2.18985	0.12501
932.79577	2.17845	0.12453
931.71755	2.16714	0.12411
930.64181	2.15589	0.12376
929.56856	2.14471	0.12348
928.49778	2.13358	0.12326
927.42946	2.12248	0.1231
926.36359	2.11142	0.12301

925.30018	2.10036	0.12298
924.2392	2.08932	0.12302
923.18066	2.07826	0.12312
922.12453	2.06719	0.12329
921.07082	2.05608	0.12353
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914.79878	1.98814	0.12665
913.76174	1.97647	0.12751
912.72704	1.96467	0.12849
911.69469	1.95273	0.1296
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909.63696	1.92833	0.13227
908.61158	1.91584	0.13387
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906.56774	1.89024	0.13769
905.54926	1.87709	0.13997
904.53307	1.86368	0.14253
903.51916	1.85002	0.14541
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901.49814	1.82188	0.15231
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899.48614	1.79264	0.16104
898.4835	1.77763	0.16623
897.4831	1.76239	0.17207
896.48492	1.74694	0.17861
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894.49521	1.71564	0.1941
893.50366	1.69994	0.20316
892.51431	1.68432	0.21319

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890.54217	1.65378	0.23623
889.55936	1.63912	0.24925
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887.60024	1.61166	0.2781
886.62391	1.59907	0.29377
885.64973	1.58734	0.31012
884.67768	1.57652	0.32705
883.70777	1.56661	0.34443
882.73998	1.55758	0.3622
881.77431	1.54938	0.38029
880.81075	1.54198	0.39868
879.84929	1.53535	0.4174
878.88993	1.52952	0.43649
877.93266	1.52454	0.45601
876.97748	1.52053	0.47597
876.02437	1.51766	0.49638
875.07332	1.51611	0.51715
874.12435	1.51608	0.53812
873.17742	1.51769	0.55904
872.23255	1.52103	0.57962
871.28972	1.52605	0.5995
870.34892	1.5326	0.61839
869.41016	1.54044	0.63604
868.47342	1.54926	0.65232
867.53869	1.55877	0.6672
866.60597	1.56871	0.68078
865.67526	1.57894	0.69321
864.74655	1.58943	0.70466
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862.89508	1.61162	0.72489
861.97232	1.62361	0.73345
861.05153	1.63625	0.74058

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859.21583	1.66239	0.74922
858.30092	1.67494	0.75047
857.38795	1.68651	0.74992
856.47692	1.69684	0.74795
855.56782	1.70589	0.74493
854.66066	1.71376	0.74112
853.75541	1.72061	0.73663
852.85208	1.72655	0.73143
851.95066	1.73158	0.72542
851.05115	1.73559	0.71849
850.15353	1.7384	0.71057
849.2578	1.73972	0.70169
848.36396	1.73929	0.69198
847.472	1.73685	0.68165
846.58191	1.73223	0.67102
845.69369	1.72532	0.66043
844.80733	1.71613	0.65024
843.92283	1.70475	0.64075
843.04017	1.6913	0.63223
842.15937	1.67597	0.6249
841.2804	1.65891	0.6189
840.40326	1.64028	0.61434
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838.65446	1.59881	0.60984
837.78279	1.57613	0.61004
836.91293	1.55224	0.61199
836.04487	1.52719	0.61581
835.17861	1.50104	0.62166
834.31414	1.47389	0.6297
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832.59057	1.4171	0.65311
831.73145	1.38784	0.66884

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828.31263	1.27138	0.76173
827.46231	1.24402	0.79267
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825.7669	1.19374	0.86338
824.9218	1.17139	0.90282
824.07843	1.15122	0.94471
823.23677	1.13341	0.98881
822.39684	1.11809	1.03488
821.55862	1.10534	1.08269
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819.88729	1.08767	1.18276
819.05417	1.08276	1.23471
818.22275	1.08048	1.28783
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815.73857	1.09	1.45369
814.91386	1.09904	1.51104
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811.63163	1.17054	1.7477
810.8152	1.19851	1.80727
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798.7629	2.02262	2.42374
797.97214	2.09477	2.44001
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796.39531	2.24324	2.45975
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794.82469	2.39369	2.46072
794.04171	2.46809	2.45423
793.26026	2.54124	2.4435
792.48036	2.61285	2.42897
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787.83293	3.00895	2.27743
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785.52959	3.1843	2.16177
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776.44939	3.60093	1.5285
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762.49399	3.52524	0.65507
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758.90451	3.42136	0.51163
758.19066	3.39965	0.48811
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748.33599	3.1212	0.28957
747.64188	3.10441	0.28184
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746.25751	3.07216	0.26801
745.56725	3.05669	0.26181
744.87826	3.04165	0.25605
744.19055	3.02702	0.25069
743.5041	3.01279	0.24569
742.81892	2.99895	0.24104
742.135	2.98549	0.2367
741.45234	2.9724	0.23266
740.77094	2.95966	0.22888
740.09078	2.94726	0.22535
739.41187	2.9352	0.22206
738.73421	2.92346	0.21898
738.05779	2.91203	0.21609
737.38261	2.9009	0.2134
736.70866	2.89005	0.21087
736.03594	2.87948	0.2085
735.36444	2.86918	0.20628
734.69418	2.85914	0.2042
734.02513	2.84935	0.20225
733.3573	2.8398	0.20042
732.69069	2.83048	0.19869
732.02528	2.82138	0.19708

731.36109	2.8125	0.19556
730.69809	2.80382	0.19413
730.0363	2.79535	0.19279
729.37571	2.78707	0.19153
728.71631	2.77898	0.19034
728.0581	2.77106	0.18923
727.40108	2.76332	0.18818
726.74524	2.75575	0.18719
726.09059	2.74834	0.18626
725.43711	2.74109	0.18539
724.78481	2.73399	0.18457
724.13368	2.72704	0.1838
723.48372	2.72022	0.18307
722.83493	2.71355	0.18239
722.1873	2.70701	0.18175
721.54083	2.70059	0.18115
720.89551	2.69431	0.18059
720.25135	2.68814	0.18006
719.60834	2.68209	0.17956
718.96647	2.67615	0.1791
718.32575	2.67032	0.17866
717.68617	2.6646	0.17825
717.04773	2.65898	0.17787
716.41042	2.65347	0.17752
715.77425	2.64805	0.17719
715.1392	2.64272	0.17688
714.50528	2.63749	0.1766
713.87248	2.63234	0.17633
713.2408	2.62729	0.17609
712.61024	2.62231	0.17586
711.9808	2.61742	0.17566
711.35246	2.61261	0.17547
710.72523	2.60787	0.17529

710.09911	2.60322	0.17514
709.47409	2.59863	0.175
708.85017	2.59412	0.17487
708.22734	2.58967	0.17476
707.60561	2.58529	0.17466
706.98497	2.58098	0.17457
706.36542	2.57674	0.1745
705.74695	2.57255	0.17443
705.12956	2.56843	0.17438
704.51325	2.56437	0.17434
703.89802	2.56036	0.17431
703.28387	2.55641	0.17429
702.67078	2.55252	0.17428
702.05876	2.54868	0.17428
701.44781	2.54489	0.17429
700.83792	2.54116	0.1743
700.22909	2.53747	0.17433
699.62132	2.53384	0.17436
699.0146	2.53025	0.1744
698.40893	2.52671	0.17445
697.80431	2.52322	0.1745
697.20073	2.51977	0.17457
696.5982	2.51636	0.17464
695.99671	2.513	0.17471
695.39626	2.50967	0.17479
694.79684	2.50639	0.17488
694.19846	2.50315	0.17497
693.6011	2.49995	0.17507
693.00478	2.49679	0.17518
692.40947	2.49367	0.17529
691.81519	2.49058	0.1754
691.22193	2.48753	0.17552
690.62969	2.48451	0.17565

690.03845	2.48153	0.17578
689.44823	2.47858	0.17591
688.85902	2.47566	0.17605
688.27082	2.47278	0.17619
687.68362	2.46993	0.17634
687.09742	2.46711	0.17649
686.51222	2.46432	0.17665
685.92801	2.46157	0.17681
685.3448	2.45884	0.17697
684.76258	2.45614	0.17714
684.18134	2.45347	0.17731
683.6011	2.45082	0.17748
683.02183	2.44821	0.17766
682.44355	2.44562	0.17784
681.86625	2.44306	0.17802
681.28992	2.44052	0.17821
680.71456	2.43801	0.1784
680.14018	2.43552	0.17859
679.56676	2.43306	0.17878
678.99431	2.43062	0.17898
678.42283	2.42821	0.17918
677.8523	2.42582	0.17938
677.28274	2.42345	0.17959
676.71413	2.42111	0.1798
676.14647	2.41878	0.18001
675.57977	2.41648	0.18022
675.01401	2.4142	0.18044
674.44921	2.41194	0.18066
673.88534	2.40971	0.18088
673.32242	2.40749	0.1811
672.76044	2.40529	0.18132
672.19939	2.40311	0.18155
671.63928	2.40095	0.18178

671.08011	2.39881	0.18201
670.52186	2.39669	0.18224
669.96454	2.39459	0.18248
669.40815	2.3925	0.18272
668.85268	2.39044	0.18295
668.29813	2.38839	0.1832
667.7445	2.38635	0.18344
667.19179	2.38434	0.18368
666.63999	2.38234	0.18393
666.0891	2.38036	0.18417
665.53912	2.37839	0.18442
664.99005	2.37644	0.18467
664.44189	2.37451	0.18493
663.89463	2.37259	0.18518
663.34827	2.37069	0.18544
662.8028	2.3688	0.18569
662.25824	2.36693	0.18595
661.71457	2.36507	0.18621
661.17179	2.36323	0.18647
660.6299	2.3614	0.18674
660.08889	2.35958	0.187
659.54877	2.35778	0.18727
659.00954	2.35599	0.18753
658.47119	2.35421	0.1878
657.93371	2.35245	0.18807
657.39712	2.3507	0.18834
656.86139	2.34897	0.18861
656.32654	2.34724	0.18889
655.79256	2.34553	0.18916
655.25945	2.34384	0.18944
654.7272	2.34215	0.18971
654.19582	2.34048	0.18999
653.6653	2.33881	0.19027

653.13564	2.33716	0.19055
652.60684	2.33552	0.19083
652.07889	2.3339	0.19112
651.55179	2.33228	0.1914
651.02555	2.33068	0.19168
650.50016	2.32908	0.19197
649.97561	2.3275	0.19226
649.45191	2.32593	0.19254
648.92906	2.32436	0.19283
648.40704	2.32281	0.19312
647.88586	2.32127	0.19341
647.36552	2.31974	0.19371
646.84602	2.31822	0.194
646.32735	2.31671	0.19429
645.80951	2.31521	0.19459
645.2925	2.31371	0.19488
644.77631	2.31223	0.19518
644.26095	2.31076	0.19548
643.74642	2.30929	0.19577
643.2327	2.30784	0.19607
642.71981	2.30639	0.19637
642.20773	2.30496	0.19667
641.69647	2.30353	0.19698
641.18602	2.30211	0.19728
640.67638	2.3007	0.19758
640.16755	2.2993	0.19788
639.65953	2.29791	0.19819
639.15232	2.29652	0.1985
638.6459	2.29514	0.1988
638.14029	2.29378	0.19911
637.63549	2.29242	0.19942
637.13147	2.29106	0.19973
636.62826	2.28972	0.20004

636.12584	2.28838	0.20035
635.62421	2.28705	0.20066
635.12337	2.28573	0.20097
634.62332	2.28442	0.20128
634.12406	2.28311	0.20159
633.62558	2.28181	0.20191
633.12789	2.28052	0.20222
632.63097	2.27924	0.20254
632.13484	2.27796	0.20285
631.63948	2.27669	0.20317
631.1449	2.27543	0.20349
630.65109	2.27417	0.2038
630.15806	2.27292	0.20412
629.6658	2.27168	0.20444
629.1743	2.27044	0.20476
628.68357	2.26921	0.20508
628.19361	2.26799	0.2054
627.7044	2.26677	0.20573
627.21596	2.26556	0.20605
626.72828	2.26436	0.20637
626.24136	2.26316	0.2067
625.75519	2.26197	0.20702
625.26978	2.26078	0.20734
624.78512	2.2596	0.20767
624.30121	2.25843	0.208
623.81805	2.25726	0.20832
623.33564	2.2561	0.20865
622.85397	2.25495	0.20898
622.37305	2.2538	0.20931
621.89287	2.25265	0.20963
621.41343	2.25152	0.20996
620.93473	2.25038	0.21029
620.45676	2.24926	0.21062

619.97953	2.24814	0.21096
619.50303	2.24702	0.21129
619.02727	2.24591	0.21162
618.55224	2.2448	0.21195
618.07793	2.2437	0.21229
617.60435	2.24261	0.21262
617.1315	2.24152	0.21295
616.65937	2.24043	0.21329
616.18796	2.23936	0.21362
615.71727	2.23828	0.21396
615.2473	2.23721	0.2143
614.77805	2.23615	0.21463
614.30951	2.23509	0.21497
613.84168	2.23403	0.21531
613.37457	2.23298	0.21565
612.90817	2.23194	0.21599
612.44248	2.2309	0.21633
611.97749	2.22986	0.21667
611.51321	2.22883	0.21701
611.04964	2.2278	0.21735
610.58676	2.22678	0.21769
610.12459	2.22576	0.21803
609.66311	2.22475	0.21837
609.20234	2.22374	0.21872
608.74226	2.22274	0.21906
608.28287	2.22174	0.2194
607.82418	2.22074	0.21975
607.36618	2.21975	0.22009
606.90886	2.21877	0.22044
606.45224	2.21778	0.22078
605.9963	2.2168	0.22113
605.54105	2.21583	0.22147
605.08648	2.21486	0.22182

604.63259	2.21389	0.22217
604.17939	2.21293	0.22252
603.72686	2.21197	0.22286
603.27501	2.21102	0.22321
602.82383	2.21007	0.22356
602.37333	2.20912	0.22391
601.92351	2.20818	0.22426
601.47435	2.20724	0.22461
601.02586	2.20631	0.22496
600.57805	2.20537	0.22531
600.13089	2.20445	0.22566
599.68441	2.20352	0.22602
599.23859	2.2026	0.22637
598.79343	2.20169	0.22672
598.34893	2.20077	0.22708
597.90509	2.19986	0.22743
597.46191	2.19896	0.22778
597.01938	2.19805	0.22814
596.57751	2.19716	0.22849
596.1363	2.19626	0.22885
595.69573	2.19537	0.2292
595.25582	2.19448	0.22956
594.81656	2.19359	0.22992
594.37794	2.19271	0.23027
593.93997	2.19183	0.23063
593.50265	2.19096	0.23099
593.06596	2.19009	0.23135
592.62992	2.18922	0.2317
592.19453	2.18835	0.23206
591.75977	2.18749	0.23242
591.32565	2.18663	0.23278
590.89216	2.18577	0.23314
590.45931	2.18492	0.2335

590.0271	2.18407	0.23386
589.59551	2.18323	0.23422
589.16456	2.18238	0.23458
588.73424	2.18154	0.23495
588.30454	2.1807	0.23531
587.87547	2.17987	0.23567
587.44703	2.17904	0.23603
587.01921	2.17821	0.2364
586.59201	2.17738	0.23676
586.16544	2.17656	0.23712
585.73949	2.17574	0.23749
585.31415	2.17492	0.23785
584.88943	2.17411	0.23822
584.46533	2.1733	0.23858
584.04184	2.17249	0.23895
583.61896	2.17168	0.23931
583.1967	2.17088	0.23968
582.77505	2.17008	0.24005
582.354	2.16928	0.24042
581.93357	2.16848	0.24078
581.51374	2.16769	0.24115
581.09452	2.1669	0.24152
580.6759	2.16611	0.24189
580.25788	2.16533	0.24226
579.84046	2.16455	0.24262
579.42365	2.16377	0.24299
579.00743	2.16299	0.24336
578.59181	2.16222	0.24373
578.17679	2.16144	0.2441
577.76236	2.16067	0.24448
577.34853	2.15991	0.24485
576.93529	2.15914	0.24522
576.52264	2.15838	0.24559

576.11058	2.15762	0.24596
575.6991	2.15686	0.24633
575.28822	2.15611	0.24671
574.87792	2.15536	0.24708
574.46821	2.15461	0.24745
574.05908	2.15386	0.24783
573.65053	2.15311	0.2482
573.24256	2.15237	0.24858
572.83518	2.15163	0.24895
572.42837	2.15089	0.24933
572.02214	2.15015	0.2497
571.61648	2.14942	0.25008
571.2114	2.14869	0.25045
570.8069	2.14796	0.25083
570.40296	2.14723	0.25121
569.9996	2.14651	0.25158
569.59681	2.14578	0.25196
569.19459	2.14506	0.25234
568.79293	2.14434	0.25272
568.39184	2.14363	0.25309
567.99132	2.14291	0.25347
567.59136	2.1422	0.25385
567.19196	2.14149	0.25423
566.79312	2.14078	0.25461
566.39485	2.14008	0.25499
565.99713	2.13937	0.25537
565.59998	2.13867	0.25575
565.20338	2.13797	0.25613
564.80733	2.13727	0.25651
564.41184	2.13658	0.25689
564.01691	2.13588	0.25727
563.62252	2.13519	0.25765
563.22869	2.1345	0.25804

562.83541	2.13381	0.25842
562.44267	2.13313	0.2588
562.05049	2.13244	0.25918
561.65885	2.13176	0.25957
561.26775	2.13108	0.25995
560.8772	2.1304	0.26034
560.48719	2.12973	0.26072
560.09773	2.12905	0.2611
559.70881	2.12838	0.26149
559.32042	2.12771	0.26187
558.93258	2.12704	0.26226
558.54527	2.12637	0.26264
558.1585	2.12571	0.26303
557.77226	2.12504	0.26342
557.38656	2.12438	0.2638
557.00139	2.12372	0.26419
556.61675	2.12306	0.26458
556.23264	2.12241	0.26496
555.84907	2.12175	0.26535
555.46602	2.1211	0.26574
555.0835	2.12045	0.26613
554.7015	2.1198	0.26651
554.32004	2.11915	0.2669
553.93909	2.1185	0.26729
553.55867	2.11786	0.26768
553.17877	2.11722	0.26807
552.79939	2.11658	0.26846
552.42054	2.11594	0.26885
552.0422	2.1153	0.26924
551.66438	2.11466	0.26963
551.28707	2.11403	0.27002
550.91028	2.1134	0.27041
550.53401	2.11276	0.2708

550.15825	2.11213	0.2712
549.783	2.11151	0.27159
549.40827	2.11088	0.27198
549.03404	2.11025	0.27237
548.66032	2.10963	0.27276
548.28712	2.10901	0.27316
547.91442	2.10839	0.27355
547.54222	2.10777	0.27394
547.17053	2.10715	0.27434
546.79935	2.10654	0.27473
546.42867	2.10592	0.27513
546.05849	2.10531	0.27552
545.68881	2.1047	0.27592
545.31964	2.10409	0.27631
544.95096	2.10348	0.27671
544.58278	2.10288	0.2771
544.21509	2.10227	0.2775
543.84791	2.10167	0.27789
543.48122	2.10106	0.27829
543.11502	2.10046	0.27869
542.74931	2.09986	0.27908
542.3841	2.09927	0.27948
542.01938	2.09867	0.27988
541.65515	2.09807	0.28027
541.29141	2.09748	0.28067
540.92816	2.09689	0.28107
540.56539	2.0963	0.28147
540.20311	2.09571	0.28187
539.84132	2.09512	0.28227
539.48001	2.09453	0.28267
539.11918	2.09395	0.28306
538.75883	2.09336	0.28346
538.39897	2.09278	0.28386

538.03959	2.0922	0.28426
537.68068	2.09162	0.28466
537.32226	2.09104	0.28506
536.96431	2.09046	0.28547
536.60684	2.08989	0.28587
536.24985	2.08931	0.28627
535.89333	2.08874	0.28667
535.53728	2.08817	0.28707
535.1817	2.0876	0.28747
534.8266	2.08703	0.28788
534.47197	2.08646	0.28828
534.11781	2.08589	0.28868
533.76412	2.08532	0.28908
533.41089	2.08476	0.28949
533.05814	2.0842	0.28989
532.70585	2.08363	0.29029
532.35402	2.08307	0.2907
532.00266	2.08251	0.2911
531.65176	2.08196	0.29151
531.30133	2.0814	0.29191
530.95136	2.08084	0.29232
530.60184	2.08029	0.29272
530.25279	2.07973	0.29313
529.9042	2.07918	0.29353
529.55606	2.07863	0.29394
529.20838	2.07808	0.29434
528.86116	2.07753	0.29475
528.5144	2.07698	0.29516
528.16808	2.07644	0.29556
527.82222	2.07589	0.29597
527.47682	2.07535	0.29638
527.13186	2.0748	0.29679
526.78736	2.07426	0.29719

526.44331	2.07372	0.2976
526.0997	2.07318	0.29801
525.75655	2.07264	0.29842
525.41384	2.07211	0.29883
525.07158	2.07157	0.29924
524.72976	2.07104	0.29964
524.38839	2.0705	0.30005
524.04746	2.06997	0.30046
523.70698	2.06944	0.30087
523.36693	2.06891	0.30128
523.02733	2.06838	0.30169
522.68817	2.06785	0.3021
522.34945	2.06732	0.30251
522.01117	2.06679	0.30293
521.67332	2.06627	0.30334
521.33591	2.06574	0.30375
520.99894	2.06522	0.30416
520.66241	2.0647	0.30457
520.3263	2.06418	0.30498
519.99064	2.06366	0.3054
519.6554	2.06314	0.30581
519.3206	2.06262	0.30622
518.98622	2.0621	0.30663
518.65228	2.06159	0.30705
518.31877	2.06107	0.30746
517.98569	2.06056	0.30787
517.65303	2.06004	0.30829
517.3208	2.05953	0.3087
516.989	2.05902	0.30911
516.65762	2.05851	0.30953
516.32667	2.058	0.30994
515.99614	2.05749	0.31036
515.66603	2.05699	0.31077

515.33635	2.05648	0.31119
515.00709	2.05598	0.3116
514.67824	2.05547	0.31202
514.34982	2.05497	0.31244
514.02182	2.05447	0.31285
513.69423	2.05397	0.31327
513.36706	2.05346	0.31369
513.04031	2.05297	0.3141
512.71397	2.05247	0.31452
512.38805	2.05197	0.31494
512.06254	2.05147	0.31535
511.73745	2.05098	0.31577
511.41277	2.05048	0.31619
511.0885	2.04999	0.31661
510.76464	2.0495	0.31702
510.44119	2.049	0.31744
510.11815	2.04851	0.31786
509.79552	2.04802	0.31828
509.4733	2.04753	0.3187
509.15148	2.04705	0.31912
508.83007	2.04656	0.31954
508.50907	2.04607	0.31996
508.18847	2.04559	0.32038
507.86827	2.0451	0.3208
507.54848	2.04462	0.32122
507.22909	2.04414	0.32164
506.91011	2.04365	0.32206
506.59152	2.04317	0.32248
506.27333	2.04269	0.3229
505.95554	2.04221	0.32332
505.63816	2.04173	0.32374
505.32117	2.04126	0.32417
505.00457	2.04078	0.32459

504.68838	2.0403	0.32501
504.37257	2.03983	0.32543
504.05717	2.03935	0.32585
503.74216	2.03888	0.32628
503.42754	2.03841	0.3267
503.11331	2.03794	0.32712
502.79948	2.03746	0.32755
502.48604	2.03699	0.32797
502.17298	2.03652	0.32839
501.86032	2.03606	0.32882
501.54805	2.03559	0.32924
501.23617	2.03512	0.32967
500.92467	2.03466	0.33009
500.61356	2.03419	0.33052
500.30283	2.03373	0.33094
499.9925	2.03326	0.33137
499.68254	2.0328	0.33179
499.37297	2.03234	0.33222
499.06379	2.03188	0.33264
498.75498	2.03142	0.33307
498.44656	2.03096	0.33349
498.13852	2.0305	0.33392
497.83086	2.03004	0.33435
497.52358	2.02958	0.33477
497.21668	2.02912	0.3352
496.91016	2.02867	0.33563
496.60401	2.02821	0.33605
496.29825	2.02776	0.33648
495.99285	2.02731	0.33691
495.68784	2.02685	0.33734
495.3832	2.0264	0.33777
495.07893	2.02595	0.33819
494.77504	2.0255	0.33862

494.47152	2.02505	0.33905
494.16837	2.0246	0.33948
493.86559	2.02415	0.33991
493.56319	2.0237	0.34034
493.26115	2.02326	0.34077
492.95948	2.02281	0.3412
492.65819	2.02237	0.34163
492.35726	2.02192	0.34206
492.05669	2.02148	0.34249
491.7565	2.02104	0.34292
491.45667	2.02059	0.34335
491.1572	2.02015	0.34378
490.85811	2.01971	0.34421
490.55937	2.01927	0.34464
490.261	2.01883	0.34507
489.96299	2.01839	0.3455
489.66534	2.01795	0.34593
489.36806	2.01752	0.34636
489.07113	2.01708	0.3468
488.77457	2.01664	0.34723
488.47836	2.01621	0.34766
488.18252	2.01577	0.34809
487.88703	2.01534	0.34853
487.5919	2.01491	0.34896
487.29712	2.01447	0.34939
487.0027	2.01404	0.34982
486.70864	2.01361	0.35026
486.41493	2.01318	0.35069
486.12158	2.01275	0.35112
485.82858	2.01232	0.35156
485.53594	2.01189	0.35199
485.24364	2.01146	0.35243
484.9517	2.01104	0.35286

484.66011	2.01061	0.3533
484.36887	2.01018	0.35373
484.07798	2.00976	0.35417
483.78743	2.00934	0.3546
483.49724	2.00891	0.35504
483.20739	2.00849	0.35547
482.9179	2.00807	0.35591
482.62875	2.00764	0.35634
482.33994	2.00722	0.35678
482.05148	2.0068	0.35722
481.76336	2.00638	0.35765
481.47559	2.00596	0.35809
481.18817	2.00554	0.35853
480.90108	2.00513	0.35896
480.61434	2.00471	0.3594
480.32794	2.00429	0.35984
480.04188	2.00388	0.36027
479.75616	2.00346	0.36071
479.47078	2.00304	0.36115
479.18574	2.00263	0.36159
478.90104	2.00222	0.36203
478.61668	2.0018	0.36246
478.33266	2.00139	0.3629
478.04897	2.00098	0.36334
477.76562	2.00057	0.36378
477.4826	2.00016	0.36422
477.19992	1.99975	0.36466
476.91757	1.99934	0.3651
476.63556	1.99893	0.36554
476.35388	1.99852	0.36598
476.07253	1.99811	0.36642
475.79152	1.99771	0.36686
475.51084	1.9973	0.3673

475.23048	1.9969	0.36774
474.95046	1.99649	0.36818
474.67077	1.99609	0.36862
474.39141	1.99568	0.36906
474.11237	1.99528	0.3695
473.83367	1.99488	0.36994
473.55529	1.99447	0.37038
473.27724	1.99407	0.37082
472.99951	1.99367	0.37126
472.72211	1.99327	0.37171
472.44504	1.99287	0.37215
472.16829	1.99247	0.37259
471.89186	1.99207	0.37303
471.61576	1.99167	0.37347
471.33998	1.99128	0.37392
471.06453	1.99088	0.37436
470.78939	1.99048	0.3748
470.51458	1.99009	0.37525
470.24008	1.98969	0.37569
469.96591	1.9893	0.37613
469.69206	1.9889	0.37658
469.41852	1.98851	0.37702
469.14531	1.98812	0.37746
468.87241	1.98772	0.37791
468.59983	1.98733	0.37835
468.32756	1.98694	0.3788
468.05561	1.98655	0.37924
467.78398	1.98616	0.37969
467.51266	1.98577	0.38013
467.24166	1.98538	0.38058
466.97097	1.98499	0.38102
466.7006	1.9846	0.38147
466.43053	1.98422	0.38191

466.16078	1.98383	0.38236
465.89135	1.98344	0.3828
465.62222	1.98306	0.38325
465.3534	1.98267	0.3837
465.0849	1.98229	0.38414
464.8167	1.9819	0.38459
464.54881	1.98152	0.38504
464.28124	1.98113	0.38548
464.01396	1.98075	0.38593
463.747	1.98037	0.38638
463.48035	1.97999	0.38682
463.214	1.97961	0.38727
462.94795	1.97922	0.38772
462.68221	1.97884	0.38817
462.41678	1.97846	0.38861
462.15165	1.97809	0.38906
461.88683	1.97771	0.38951
461.62231	1.97733	0.38996
461.35809	1.97695	0.39041
461.09417	1.97657	0.39086
460.83056	1.9762	0.3913
460.56724	1.97582	0.39175
460.30423	1.97545	0.3922
460.04152	1.97507	0.39265
459.7791	1.9747	0.3931
459.51699	1.97432	0.39355
459.25518	1.97395	0.394
458.99366	1.97358	0.39445
458.73244	1.9732	0.3949
458.47152	1.97283	0.39535
458.21089	1.97246	0.3958
457.95056	1.97209	0.39625
457.69053	1.97172	0.3967

457.43079	1.97135	0.39715
457.17135	1.97098	0.3976
456.9122	1.97061	0.39805
456.65334	1.97024	0.39851
456.39478	1.96987	0.39896
456.13651	1.9695	0.39941
455.87853	1.96914	0.39986
455.62084	1.96877	0.40031
455.36345	1.9684	0.40076
455.10634	1.96804	0.40122
454.84953	1.96767	0.40167
454.593	1.96731	0.40212
454.33677	1.96694	0.40257
454.08082	1.96658	0.40303
453.82516	1.96622	0.40348
453.56979	1.96585	0.40393
453.31471	1.96549	0.40438
453.05991	1.96513	0.40484
452.8054	1.96477	0.40529
452.55118	1.96441	0.40574
452.29724	1.96405	0.4062
452.04358	1.96369	0.40665
451.79021	1.96333	0.40711
451.53712	1.96297	0.40756
451.28432	1.96261	0.40801
451.0318	1.96225	0.40847
450.77956	1.96189	0.40892
450.52761	1.96153	0.40938
450.27593	1.96118	0.40983
450.02454	1.96082	0.41029
449.77343	1.96046	0.41074
449.52259	1.96011	0.4112
449.27204	1.95975	0.41165

449.02177	1.9594	0.41211
448.77177	1.95905	0.41256
448.52205	1.95869	0.41302
448.27261	1.95834	0.41348
448.02345	1.95799	0.41393
447.77457	1.95763	0.41439
447.52596	1.95728	0.41484
447.27763	1.95693	0.4153
447.02957	1.95658	0.41576
446.78179	1.95623	0.41621
446.53428	1.95588	0.41667
446.28704	1.95553	0.41713
446.04008	1.95518	0.41759
445.7934	1.95483	0.41804
445.54698	1.95448	0.4185
445.30084	1.95413	0.41896
445.05497	1.95379	0.41942
444.80937	1.95344	0.41987
444.56404	1.95309	0.42033
444.31898	1.95274	0.42079
444.0742	1.9524	0.42125
443.82968	1.95205	0.42171
443.58543	1.95171	0.42217
443.34145	1.95136	0.42262
443.09774	1.95102	0.42308
442.85429	1.95068	0.42354
442.61112	1.95033	0.424
442.36821	1.94999	0.42446
442.12556	1.94965	0.42492
441.88319	1.9493	0.42538
441.64108	1.94896	0.42584
441.39923	1.94862	0.4263
441.15765	1.94828	0.42676

440.91633	1.94794	0.42722
440.67528	1.9476	0.42768
440.43449	1.94726	0.42814
440.19396	1.94692	0.4286
439.95369	1.94658	0.42906
439.71369	1.94624	0.42952
439.47395	1.94591	0.42998
439.23447	1.94557	0.43044
438.99525	1.94523	0.4309
438.75629	1.94489	0.43136
438.5176	1.94456	0.43183
438.27916	1.94422	0.43229
438.04098	1.94389	0.43275
437.80306	1.94355	0.43321
437.56539	1.94322	0.43367
437.32799	1.94288	0.43413
437.09084	1.94255	0.4346
436.85395	1.94222	0.43506
436.61732	1.94188	0.43552
436.38094	1.94155	0.43598
436.14482	1.94122	0.43645
435.90895	1.94088	0.43691
435.67334	1.94055	0.43737
435.43799	1.94022	0.43783
435.20288	1.93989	0.4383
434.96804	1.93956	0.43876
434.73344	1.93923	0.43922
434.4991	1.9389	0.43969
434.26501	1.93857	0.44015
434.03117	1.93824	0.44062
433.79758	1.93791	0.44108
433.56425	1.93759	0.44154
433.33117	1.93726	0.44201

433.09833	1.93693	0.44247
432.86575	1.9366	0.44294
432.63342	1.93628	0.4434
432.40133	1.93595	0.44387
432.1695	1.93563	0.44433
431.93791	1.9353	0.4448
431.70657	1.93498	0.44526
431.47548	1.93465	0.44573
431.24463	1.93433	0.44619
431.01404	1.934	0.44666
430.78369	1.93368	0.44712
430.55358	1.93336	0.44759
430.32372	1.93303	0.44805
430.09411	1.93271	0.44852
429.86474	1.93239	0.44898
429.63562	1.93207	0.44945
429.40674	1.93175	0.44992
429.1781	1.93142	0.45038
428.94971	1.9311	0.45085
428.72156	1.93078	0.45132
428.49365	1.93046	0.45178
428.26598	1.93014	0.45225
428.03856	1.92983	0.45272
427.81138	1.92951	0.45318
427.58444	1.92919	0.45365
427.35774	1.92887	0.45412
427.13128	1.92855	0.45459
426.90506	1.92824	0.45505
426.67907	1.92792	0.45552
426.45333	1.9276	0.45599
426.22783	1.92729	0.45646
426.00257	1.92697	0.45693
425.77754	1.92665	0.45739

425.55275	1.92634	0.45786
425.3282	1.92602	0.45833
425.10388	1.92571	0.4588
424.87981	1.9254	0.45927
424.65596	1.92508	0.45974
424.43236	1.92477	0.46021
424.20899	1.92446	0.46067
423.98585	1.92414	0.46114
423.76295	1.92383	0.46161
423.54028	1.92352	0.46208
423.31785	1.92321	0.46255
423.09565	1.9229	0.46302
422.87368	1.92259	0.46349
422.65195	1.92227	0.46396
422.43044	1.92196	0.46443
422.20917	1.92165	0.4649
421.98814	1.92135	0.46537
421.76733	1.92104	0.46584
421.54675	1.92073	0.46631
421.32641	1.92042	0.46678
421.10629	1.92011	0.46725
420.88641	1.9198	0.46772
420.66675	1.9195	0.46819
420.44733	1.91919	0.46866
420.22813	1.91888	0.46914
420.00916	1.91857	0.46961
419.79042	1.91827	0.47008
419.57191	1.91796	0.47055
419.35362	1.91766	0.47102
419.13556	1.91735	0.47149
418.91773	1.91705	0.47196
418.70012	1.91674	0.47244
418.48274	1.91644	0.47291

418.26559	1.91614	0.47338
418.04866	1.91583	0.47385
417.83196	1.91553	0.47432
417.61548	1.91523	0.4748
417.39922	1.91492	0.47527
417.18319	1.91462	0.47574
416.96738	1.91432	0.47621
416.7518	1.91402	0.47669
416.53643	1.91372	0.47716
416.32129	1.91342	0.47763
416.10638	1.91312	0.47811
415.89168	1.91282	0.47858
415.67721	1.91252	0.47905
415.46295	1.91222	0.47953
415.24892	1.91192	0.48
415.03511	1.91162	0.48047
414.82152	1.91132	0.48095
414.60814	1.91102	0.48142
414.39499	1.91072	0.4819
414.18206	1.91043	0.48237
413.96934	1.91013	0.48284
413.75685	1.90983	0.48332
413.54457	1.90954	0.48379
413.33251	1.90924	0.48427
413.12066	1.90894	0.48474
412.90904	1.90865	0.48522
412.69763	1.90835	0.48569
412.48643	1.90806	0.48617
412.27546	1.90776	0.48664
412.06469	1.90747	0.48712
411.85415	1.90717	0.48759
411.64382	1.90688	0.48807
411.4337	1.90659	0.48854

411.2238	1.90629	0.48902
411.01411	1.906	0.48949
410.80463	1.90571	0.48997
410.59537	1.90542	0.49045
410.38633	1.90512	0.49092
410.17749	1.90483	0.4914
409.96887	1.90454	0.49187
409.76046	1.90425	0.49235
409.55226	1.90396	0.49283
409.34427	1.90367	0.4933
409.13649	1.90338	0.49378
408.92893	1.90309	0.49426
408.72157	1.9028	0.49473
408.51443	1.90251	0.49521
408.3075	1.90222	0.49569
408.10077	1.90193	0.49617
407.89425	1.90165	0.49664
407.68795	1.90136	0.49712
407.48185	1.90107	0.4976
407.27596	1.90078	0.49807
407.07028	1.9005	0.49855
406.8648	1.90021	0.49903
406.65953	1.89992	0.49951
406.45447	1.89964	0.49999
406.24962	1.89935	0.50046
406.04497	1.89907	0.50094
405.84053	1.89878	0.50142
405.6363	1.8985	0.5019
405.43226	1.89821	0.50238
405.22844	1.89793	0.50286
405.02482	1.89764	0.50333
404.8214	1.89736	0.50381
404.61819	1.89708	0.50429

404.41519	1.89679	0.50477
404.21238	1.89651	0.50525
404.00978	1.89623	0.50573
403.80738	1.89595	0.50621
403.60519	1.89566	0.50669
403.4032	1.89538	0.50717
403.20141	1.8951	0.50765
402.99982	1.89482	0.50813
402.79843	1.89454	0.50861
402.59725	1.89426	0.50909
402.39626	1.89398	0.50957
402.19548	1.8937	0.51005
401.99489	1.89342	0.51053
401.79451	1.89314	0.51101
401.59432	1.89286	0.51149
401.39434	1.89258	0.51197
401.19455	1.8923	0.51245
400.99497	1.89202	0.51293
400.79558	1.89175	0.51341
400.59639	1.89147	0.51389
400.39739	1.89119	0.51437
400.1986	1.89091	0.51485
400	1.89064	0.51533