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# Surface plasmons in quantum-sized noble-metal clusters: TDDFT quantum calculations and the classical picture of charge oscillations

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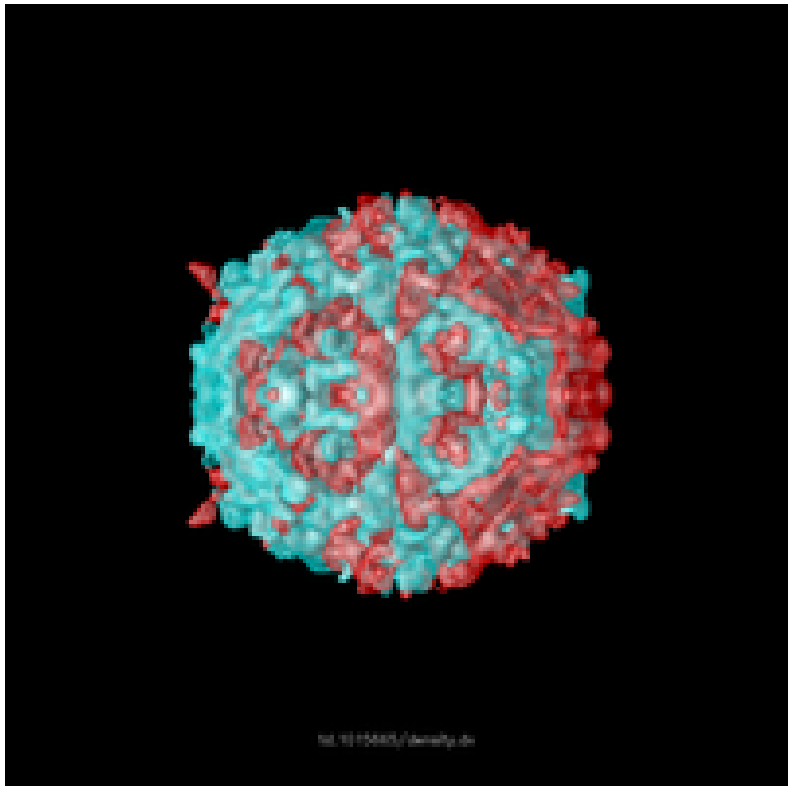
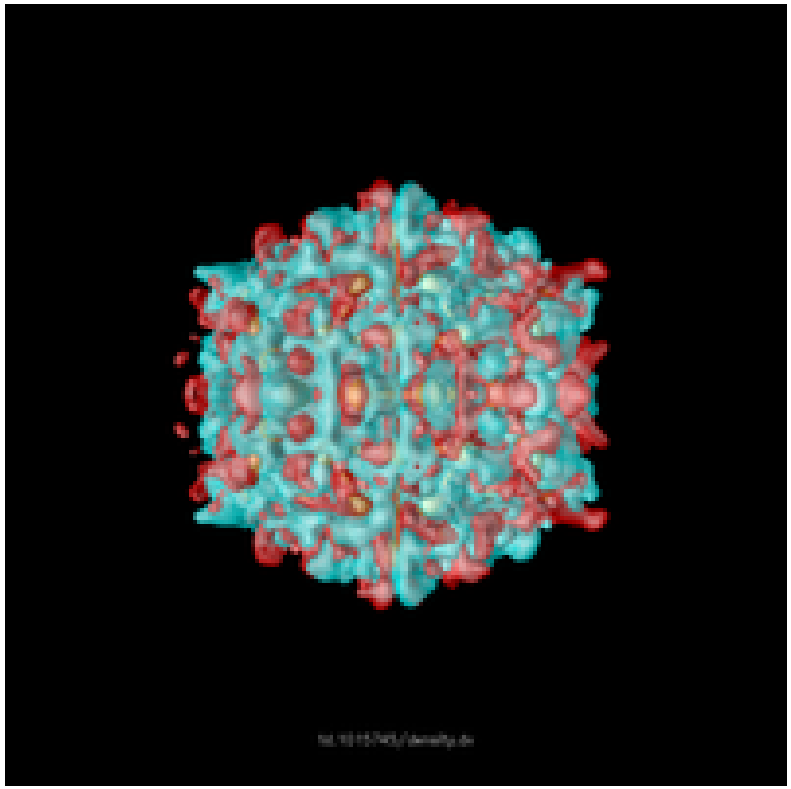
# Icosahedra $Ag_{147}$ and $Au_{147}$



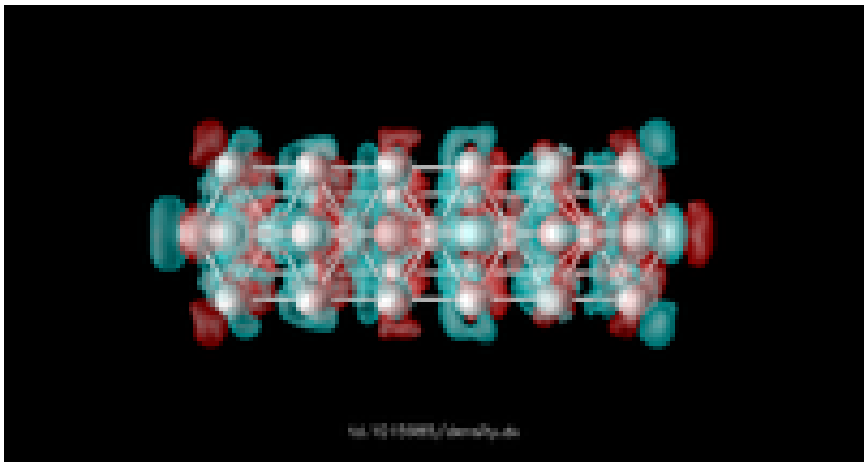
$Ag_{147}$



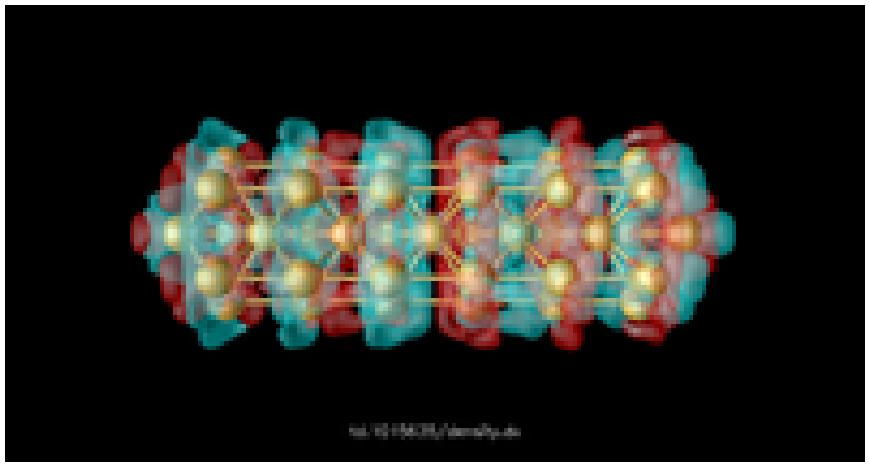
$Au_{147}$

**Animation A:** Isosurfaces of the difference between time-dependent density and ground state density $\rho(\mathbf{r}, t) - \rho_{gs}(\mathbf{r})$, at a value of $1 \times 10^{-5}$ Å$^{-3}$, corresponding to Fig. 2 of the article: Icosahedral $Ag_{147}$ (left) and $Au_{147}$ (right). For $Ag_{147}$, one period of the approximatly perodic movement is shown, whereas for $Au_{147}$, a relatively arbitrary interval was chosen out of the entirely non-periodic dynamics. The shown interval starts after about 25 fs of time evolution (see Fig. 2 of the article).

# Nanorods $Ag_{37}$ and $Au_{37}$



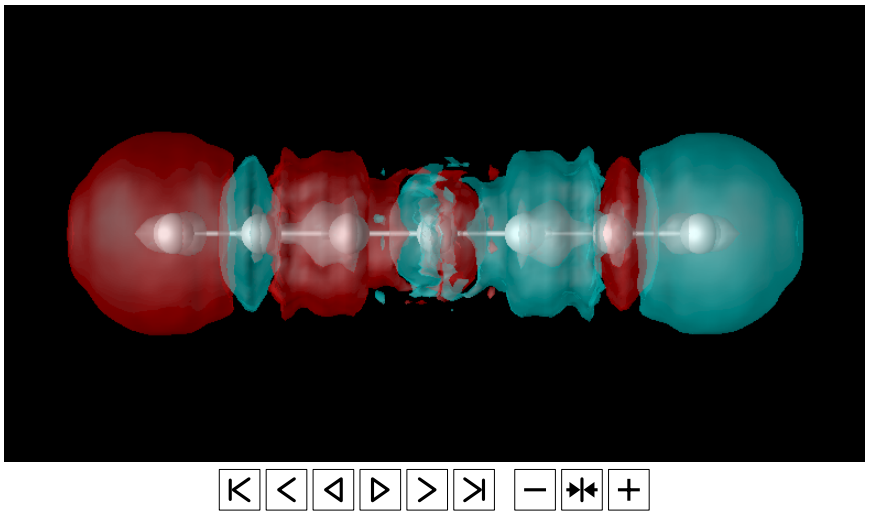
$Ag_{37}$

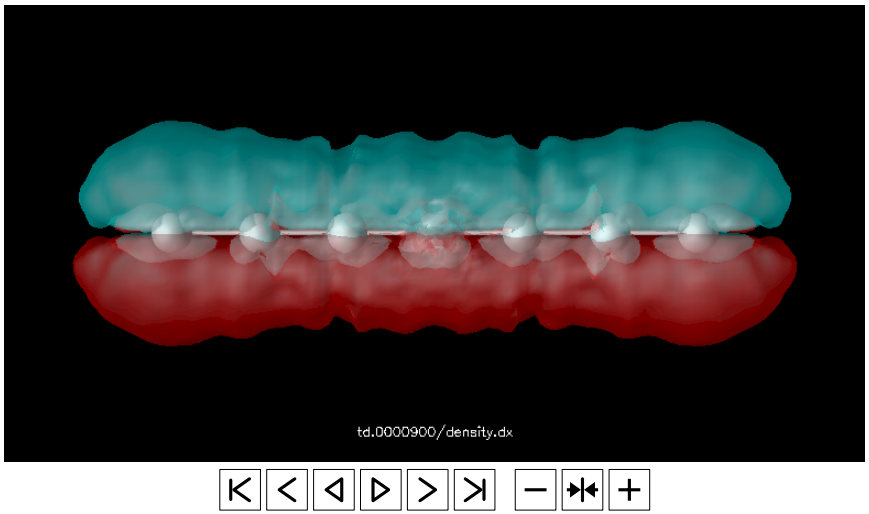


$Au_{37}$

**Animation B:** Time-dependent density $\rho(\mathbf{r}, t) - \rho_{gs}(\mathbf{r})$, at a value of $1 \times 10^{-4}$ Å$^{-3}$, corresponding to Fig. 3 of the article: pentagonal nanorods $Ag_{37}$ (left) and $Au_{37}$ (right). For $Ag_{37}$, one period of the approximatly perodic movement is shown, whereas for $Au_{37}$, a relatively arbitrary interval was chosen out of the entirely non-periodic dynamics. The shown interval starts after about 25 fs of time evolution. Red = positive, blue = negative difference $\rho(\mathbf{r}, t) - \rho_{gs}(\mathbf{r})$.

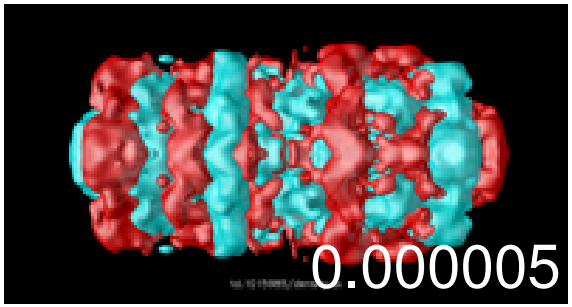
# Monatomic chain $Ag_7$

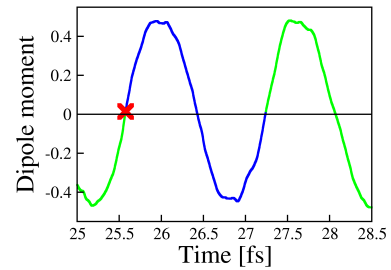


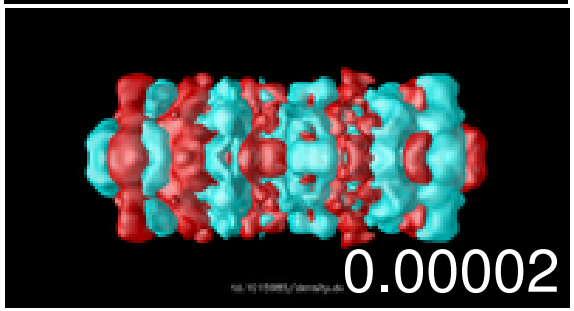


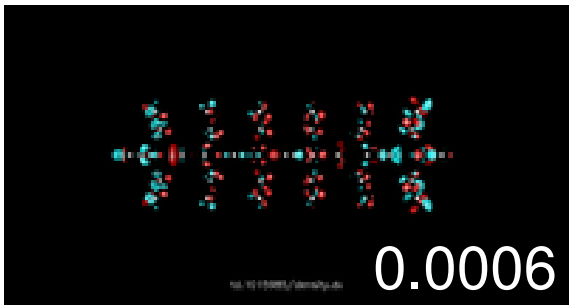

**Animation C:** Time-dependent density corresponding to Fig. 5 of the article: monatomic chains $Ag_7$ for an excitation along the axis (left) and perpendicular to the axis of the chain (right). Shown is the difference between time-dependent density and ground-state density $\rho(\mathbf{r}, t) - \rho_{gs}(\mathbf{r})$ (red = positive, blue = negative), at a value of $1 \times 10^{-5}$ Å$^{-3}$.

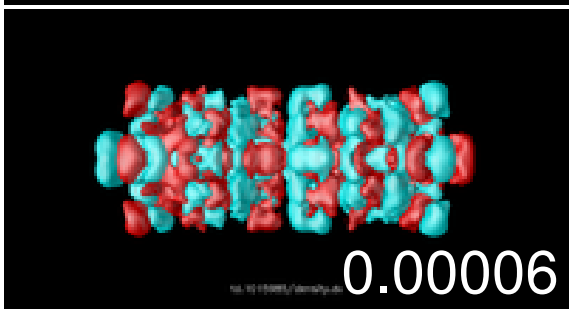
# Screening by d electrons: rod $Ag_{37}$

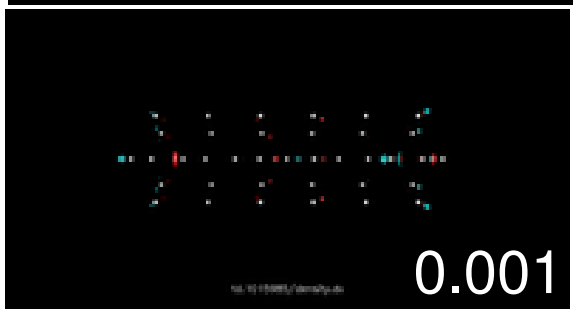


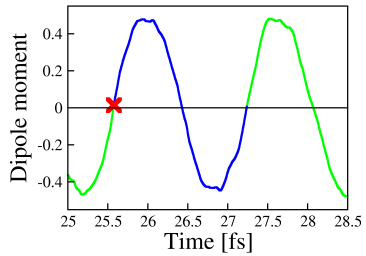



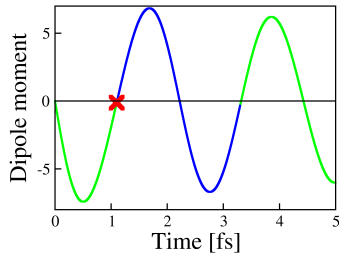




**Animation D:** Time-dependent density corresponding to Fig. 6 of the article: pentagonal nanorod $Ag_{37}$ for an excitation along the axis for different isovalues as indicated, in units of $Å^{-3}$.

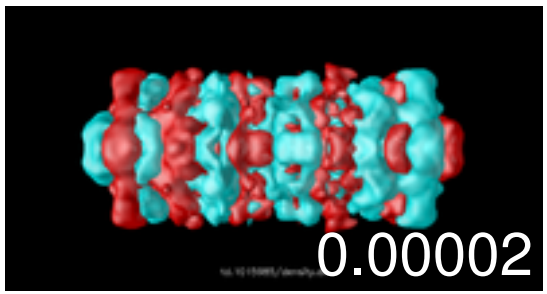
# Comparison Ag vs. Na (no d electrons)

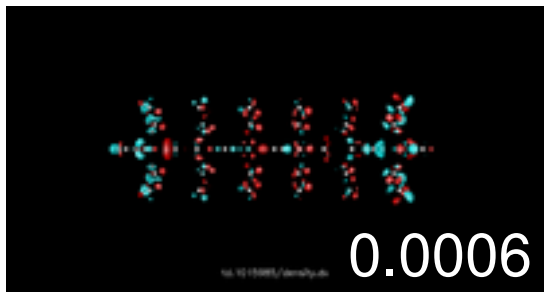
$Ag_{37}$

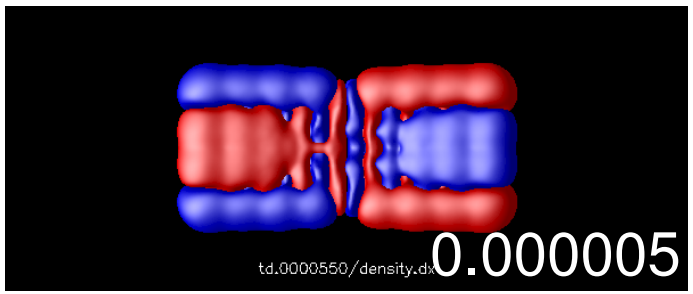


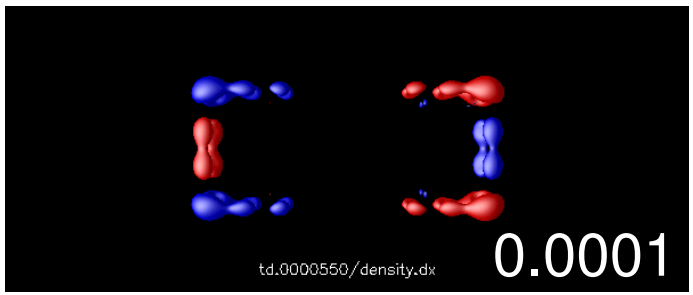




$Na_{216}$




**Animation E:** Time-dependent density corresponding to Fig. 7 of the article: pentagonal nanorod $Ag_{37}$ for an excitation along the axis for different isovalues as indicated, in units of $Å^{-3}$, compared with a 216-atom sodium rod.