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ELECTRONIC SUPPLEMENTARY INFORMATION

In situ structure and force characterization of 2D nano-colloids at the air/water interface

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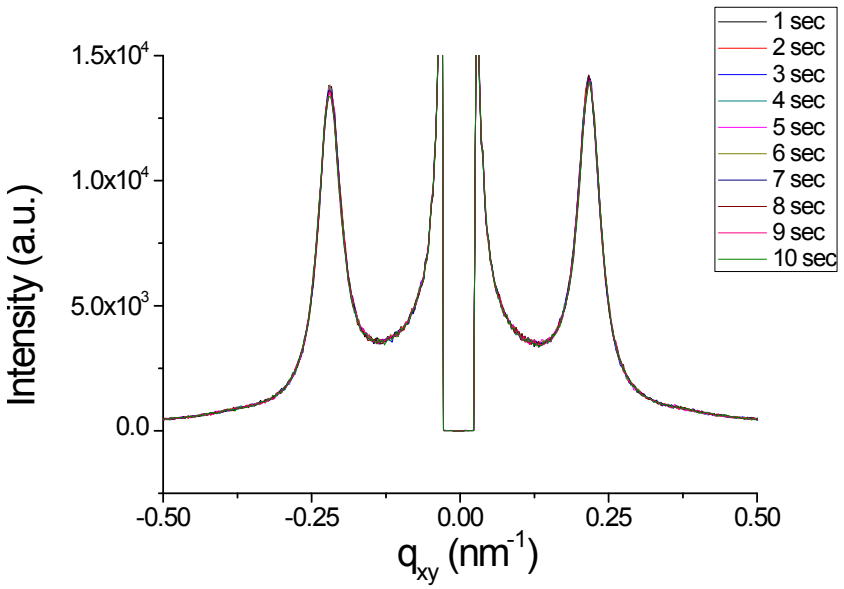


Fig. S1: Evolution of the GISAXS Bragg rods with x-ray illumination. Ten subsequent 1 second illuminations do not lead to any variation of peak intensity and shape demonstrating that, under the employed experimental conditions, no radiation damage occurs.

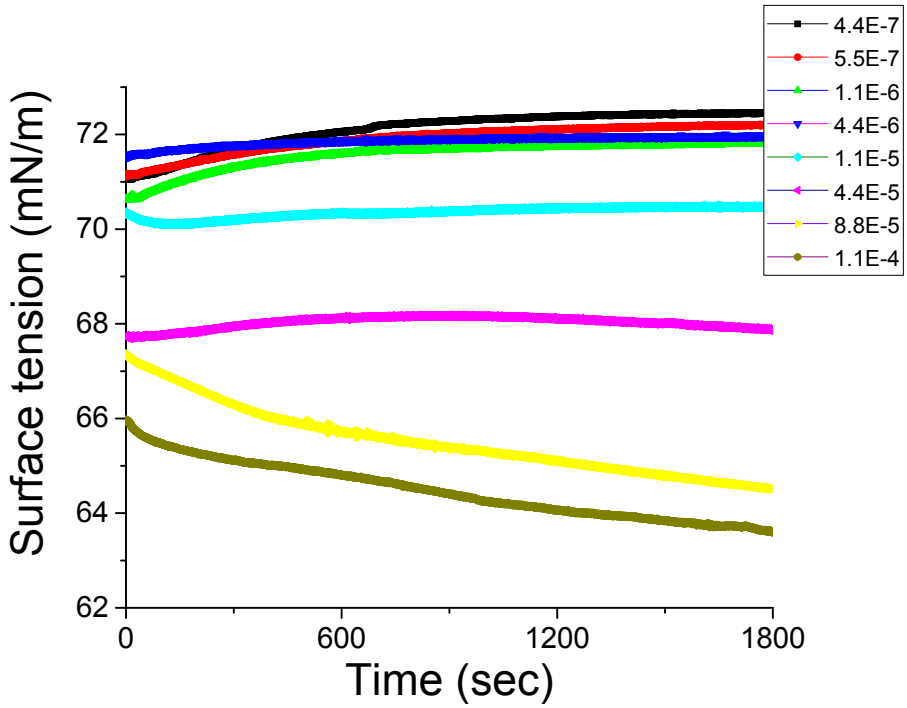


Fig. S2: Temporal evolution of surface tension for mixed NPs 0.1%wt NaCl 1mM dispersions at the different CTAB concentrations (mol/L) reported in the box.

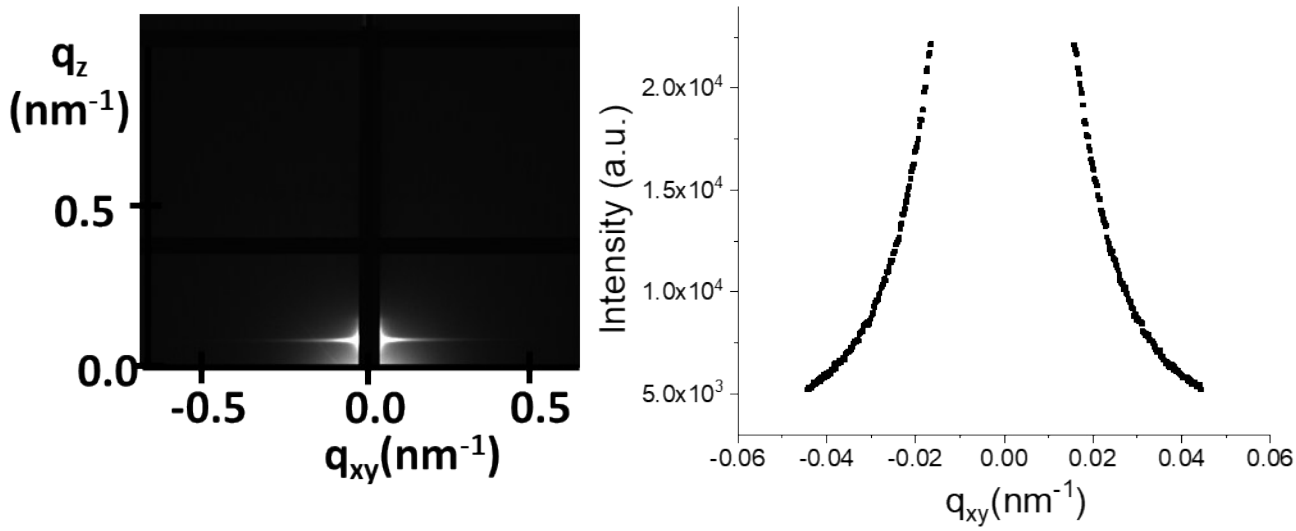


Fig. S3: GISAXS pattern of NPs 0.1% wt NaCl 1 mM monolayer (left) and the corresponding horizontal cut between q_z 0.09 and 0.13 nm^{-1} (right). The clear absence of Bragg rods reveals no NP monolayer formation.

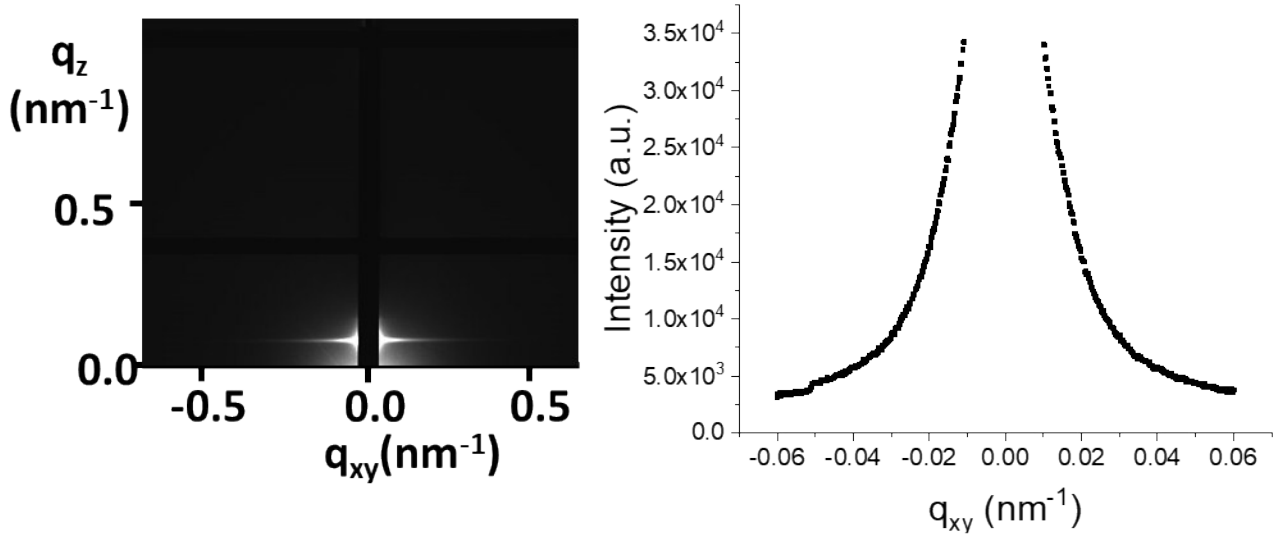


Fig. S4: GISAXS pattern of CTAB $1.1 \cdot 10^{-6}$ M NaCl 1 mM monolayer (left) and the corresponding horizontal cut between q_z 0.09 and 0.13 nm^{-1} (right). The clear absence of Bragg rods reveals no NP monolayer formation.

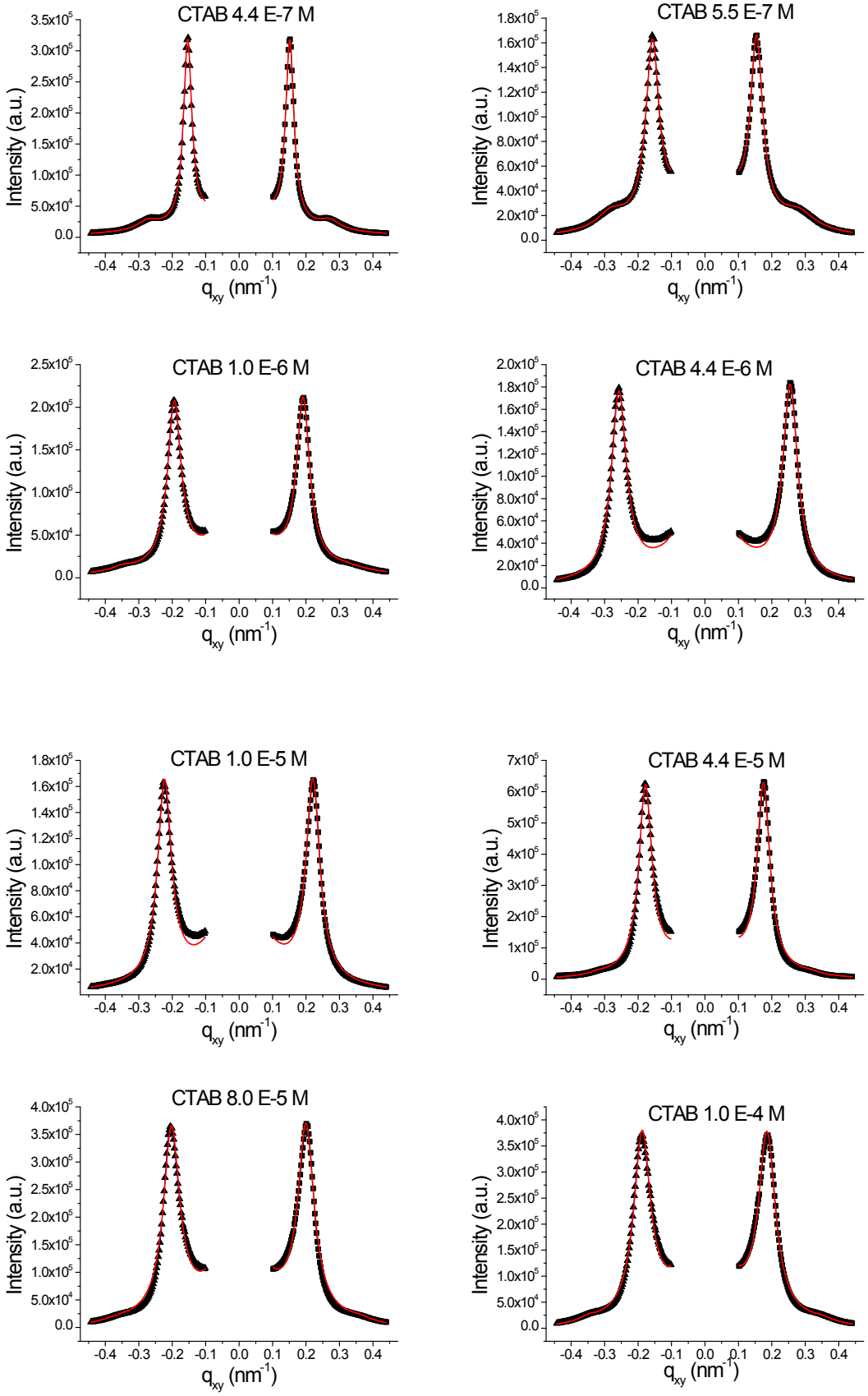
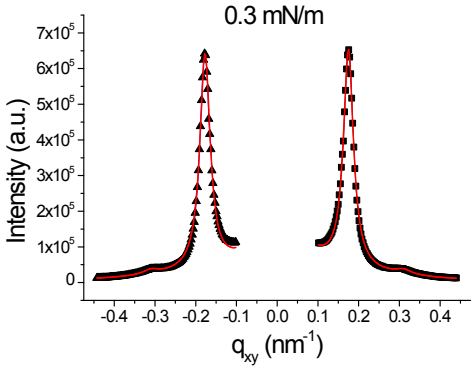
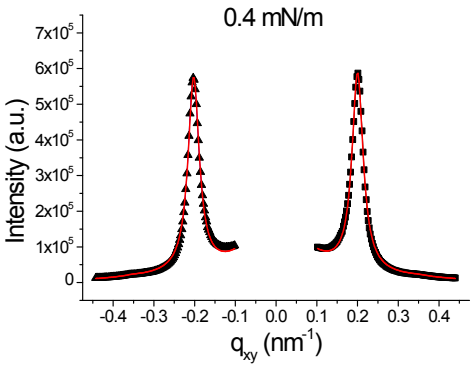
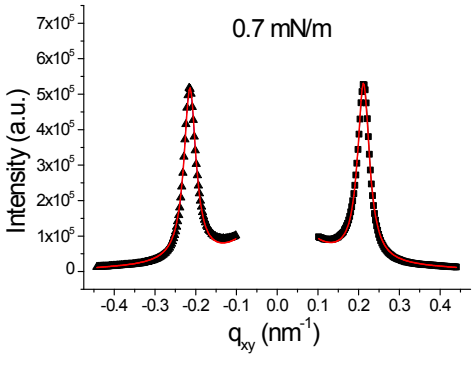


Fig. S5: GISAXS peak fittings (black symbols: experimental peak, red lines: fitting) of SiO_2 NP monolayers at various CTAB concentrations.


0.3 mN/m
Intensity (a.u.)
7x10^5
6x10^5
5x10^5
4x10^5
3x10^5
2x10^5
1x10^5
0
-0.4 -0.3 -0.2 -0.1 0.0 0.1 0.2 0.3 0.4
q_xy (nm^-1)


0.4 mN/m
Intensity (a.u.)
7x10^5
6x10^5
5x10^5
4x10^5
3x10^5
2x10^5
1x10^5
0
-0.4 -0.3 -0.2 -0.1 0.0 0.1 0.2 0.3 0.4
q_xy (nm^-1)


0.7 mN/m
Intensity (a.u.)
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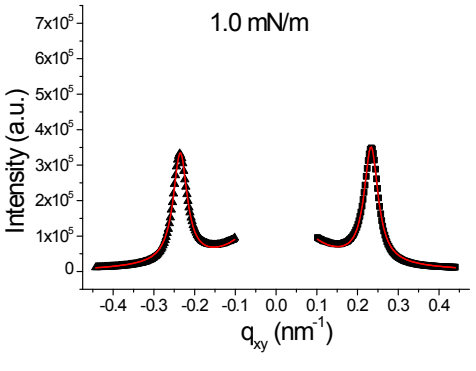
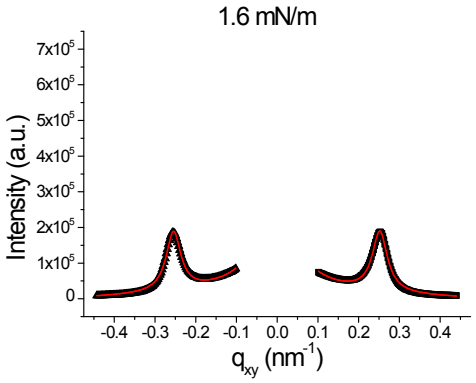
6x10^5
5x10^5
4x10^5
3x10^5
2x10^5
1x10^5
0
-0.4 -0.3 -0.2 -0.1 0.0 0.1 0.2 0.3 0.4
q_xy (nm^-1)


1.0 mN/m
Intensity (a.u.)
7x10^5
6x10^5
5x10^5
4x10^5
3x10^5
2x10^5
1x10^5
0
-0.4 -0.3 -0.2 -0.1 0.0 0.1 0.2 0.3 0.4
q_xy (nm^-1)


1.6 mN/m
Intensity (a.u.)
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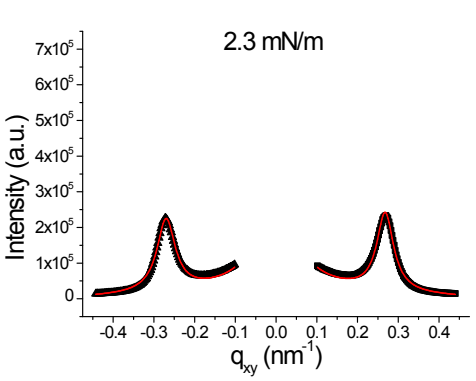
6x10^5
5x10^5
4x10^5
3x10^5
2x10^5
1x10^5
0
-0.4 -0.3 -0.2 -0.1 0.0 0.1 0.2 0.3 0.4
q_xy (nm^-1)


2.3 mN/m
Intensity (a.u.)
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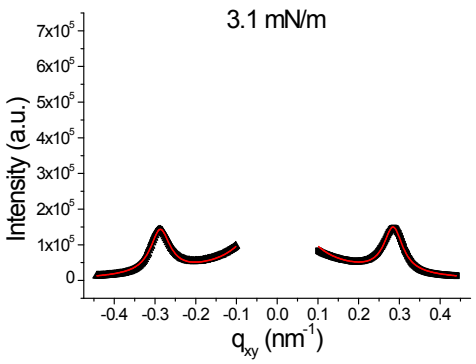
6x10^5
5x10^5
4x10^5
3x10^5
2x10^5
1x10^5
0
-0.4 -0.3 -0.2 -0.1 0.0 0.1 0.2 0.3 0.4
q_xy (nm^-1)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Intensity (a.u.)
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5x10^5
4x10^5
3x10^5
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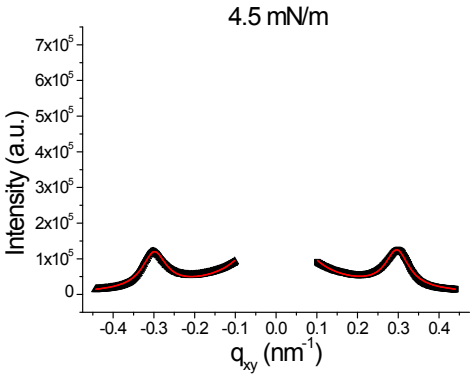
-0.4 -0.3 -0.2 -0.1 0.0 0.1 0.2 0.3 0.4
q_xy (nm^-1)


4.5 mN/m
Intensity (a.u.)
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6x10^5
5x10^5
4x10^5
3x10^5
2x10^5
1x10^5
0
-0.4 -0.3 -0.2 -0.1 0.0 0.1 0.2 0.3 0.4
q_xy (nm^-1)

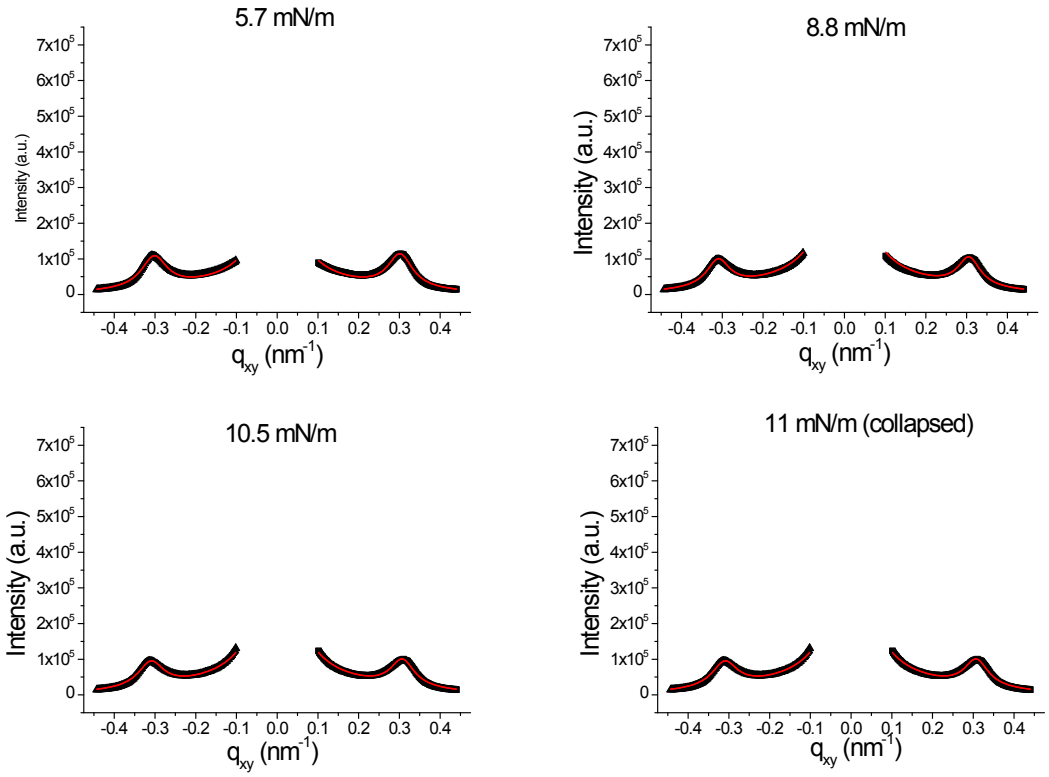
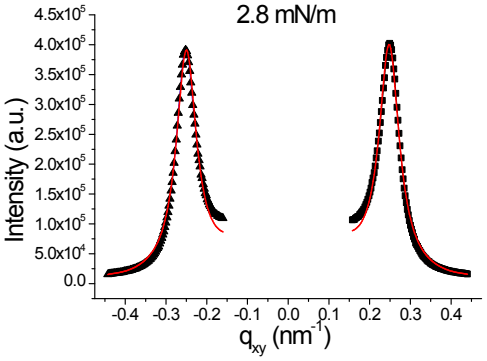
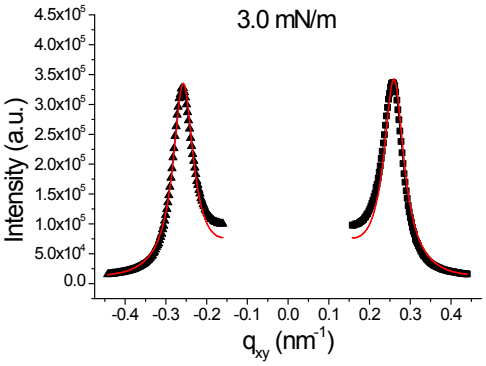
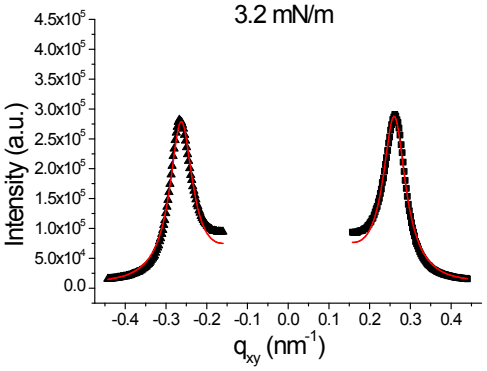
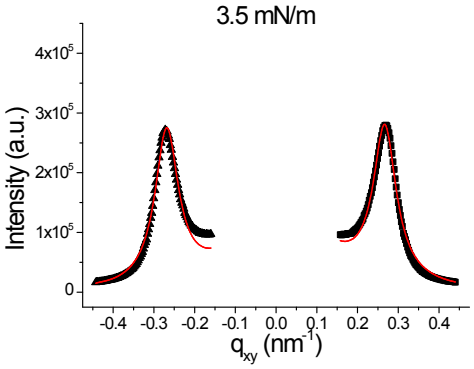


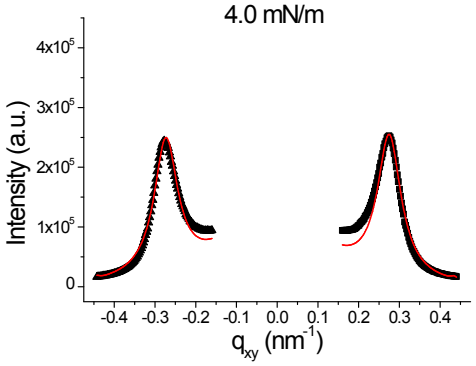
Fig. S6: GISAXS peak fittings (black symbols: experimental peak, red lines: fitting) during compression of the SiO_2 NP 0.1% wt, NaCl 1mM, CTAB $4.4 \cdot 10^{-7}$ M monolayer.

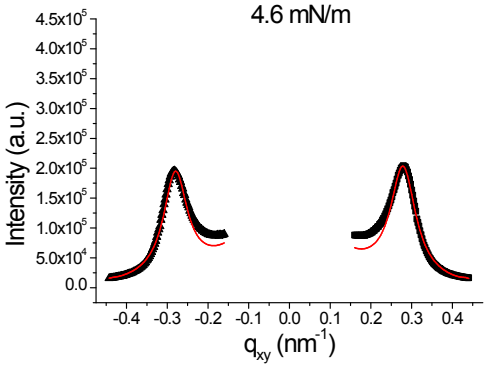

2.8 mN/m
Intensity (a.u.)
q_{xy} (nm^{-1})

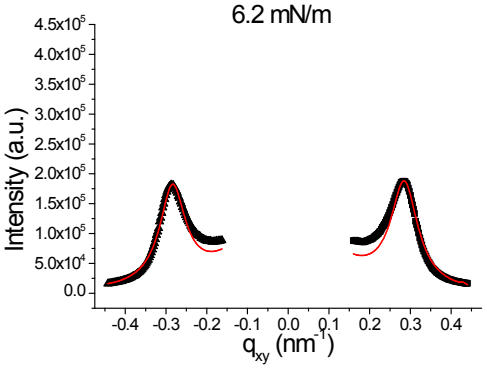

3.0 mN/m
Intensity (a.u.)
q_{xy} (nm^{-1})

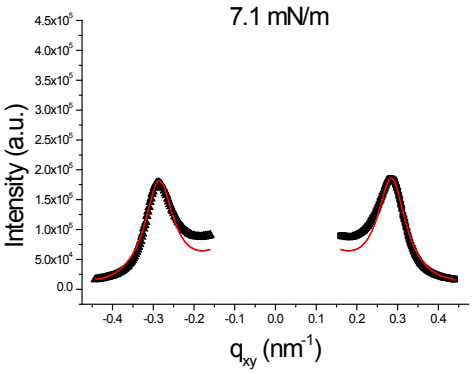

3.2 mN/m
Intensity (a.u.)
q_{xy} (nm^{-1})


3.5 mN/m
Intensity (a.u.)
q_{xy} (nm^{-1})


4.0 mN/m
Intensity (a.u.)
q_{xy} (nm^{-1})


4.6 mN/m
Intensity (a.u.)
q_{xy} (nm^{-1})


6.2 mN/m
Intensity (a.u.)
q_{xy} (nm^{-1})


7.1 mN/m
Intensity (a.u.)
q_{xy} (nm^{-1})

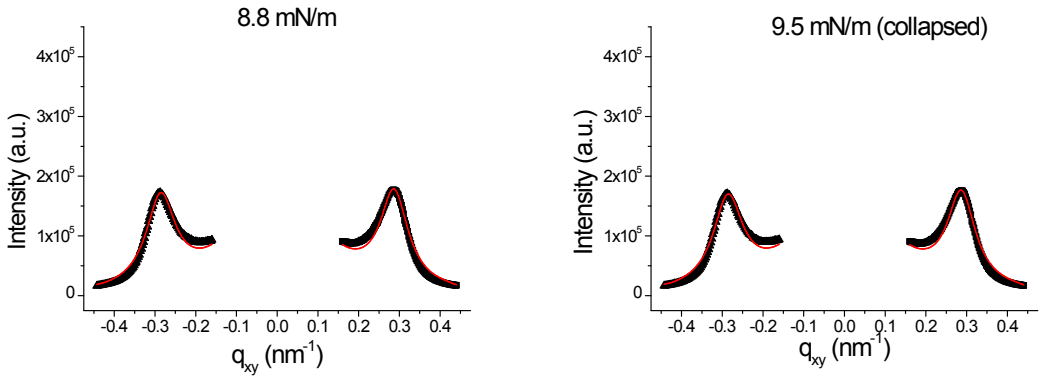


Fig. S7: GISAXS peak fittings (black symbols: experimental peak, red lines: fitting) during compression of the SiO_2 NP 0.1% wt, NaCl 1mM, CTAB $4.4 \cdot 10^{-6}$ M monolayer

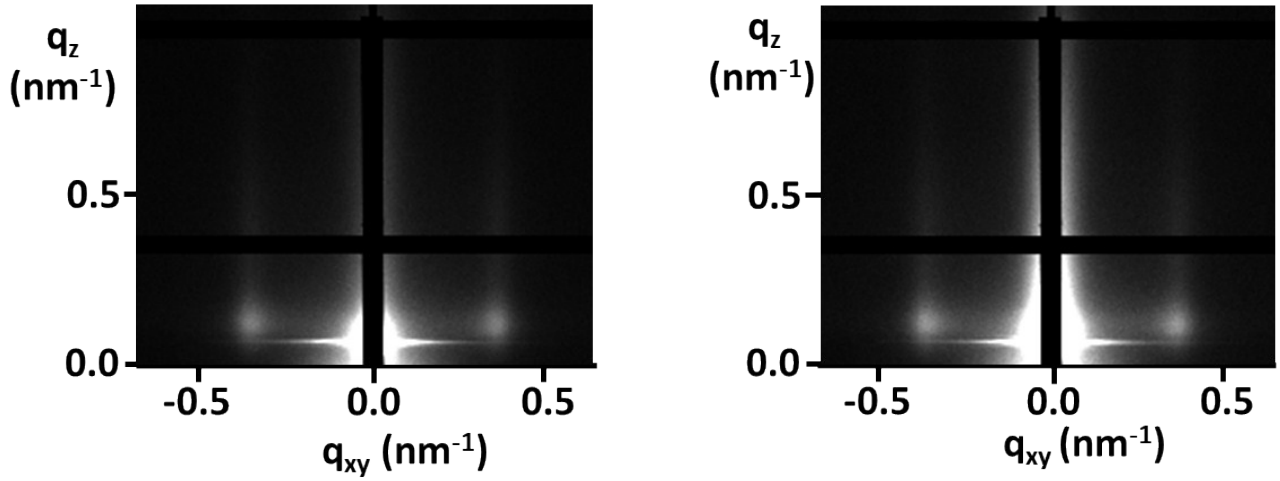


Fig. S8: GISAXS patterns of the compressed NPs 0.1% wt NaCl 1 mM CTAB $4.4 \cdot 10^{-7}$ M monolayer before (left) and after (right) the collapse. The presence of diffraction rods rather than rings after the collapse indicates that the system keeps a purely bidimensional structure.

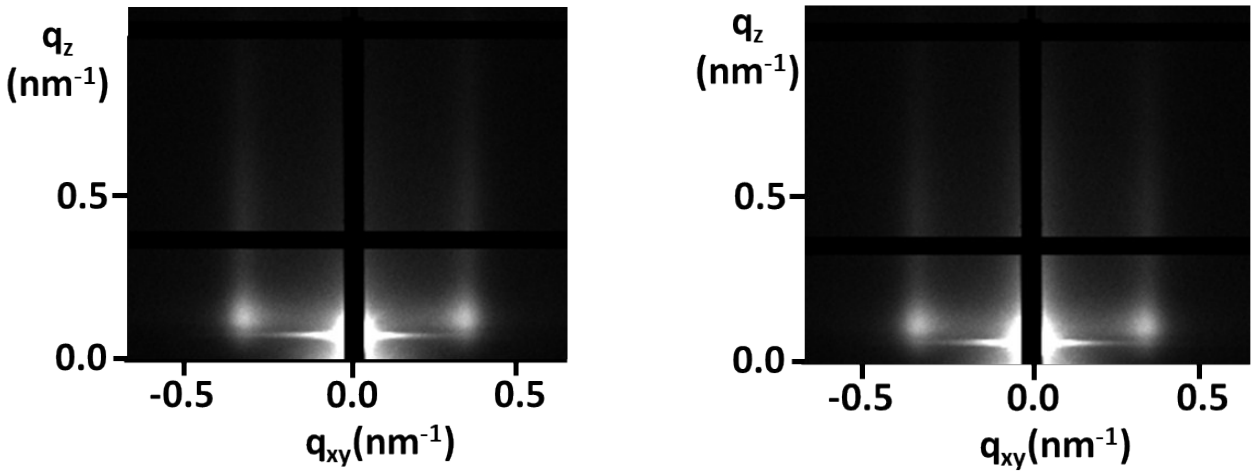


Fig. S9: GISAXS patterns of the compressed NPs 0.1% wt NaCl 1 mM CTAB $4.4 \cdot 10^{-6}$ M monolayer before (left) and after (right) the collapse. The presence of diffraction rods rather than rings after the collapse indicates that the system keeps a purely bidimensional structure.