## Supporting information to 'Local optical chirality induced by near-field mode interference in achiral plasmonic metamolecules'

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This Supporting Information file contains the following five figures.

- Figure S1: calculation of the relative weights of the six SACs, showing that the radial (R) and breathing (B) modes exhibit negligible contribution under in-plane excitation.
- Figure S2: polarization ellipses for all polarizations.
- **Figure S3:** effect of the gap distance on the optical chirality, demonstrating that the strength of the optical chirality depends on the coupling strength between the individual meta-atoms.
- Figure S4: 1-photon and 2-photon absorption spectra of PMMA-DR1.
- **Figure S5:** larger area images of the plasmonic metamolecules after interaction with polarized light, showing the good reproducibility of the results.



**Figure S1.** *Left panel:* Relative contributions of the six SACs under circularly polarized excitation. The radial and breathing modes contributions are extremely weak and are not visible on this scale. *Right panel:* magnification of the previous panel showing the radial and breathing modes contribution.



Figure S2. Polarization ellipses for all four possible polarizations, plotted at five different wavelengths.



**Figure S3.** *Top:* Maps of the normalized optical chirality density  $\hat{C}$  for g = 150 nm and g = 30 nm. *Down:*  $\hat{C}$  computed at the center of the metamolecule for different interparticle distances g.



**Figure S4.** Light absorption in PMMA-DR1. *Blue curve:* 1-photon absorption spectrum of a solution of PMMA-DR1 diluted in toluene. *Red dots:* 2-photon absorption spectrum of PMMA-DR1. The absorption coefficient has been measured on a 100-nm-thick film using a pulsed (fs) excitayion from a tunable Ti:Sa laser source. The solid red line is a guide to the eye. Data extracted from [1].



**Figure S5.** AFM images of arrays of trimers after illumination with LCP (left) and RCP (right).

## REFERENCES

[1] Zhang, Y.; Demesy, G.; Haggui, M.; Gérard, D.; Beal, J.; Dodson, S.; Xiong, Q.; Plain, J.;
Bonod, N.; Bachelot, R. Nanoscale Switching of Near-Infrared Hot Spots in Plasmonic Oligomers
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