Supplementary information

Strongly coupled evenly divided disks: a new compact and tunable platform for plasmonic Fano resonances

Shi Zhang¹, Xupeng Zhu², Wei Xiao³⁴, Huimin Shi⁵, Yasi Wang¹,
Zhiquan Chen¹, Yiqin Chen¹, Kai Sun³, Otto L. Muskens³, C. H. de Groot⁴, Shao-Ding Liu⁶, Huigao Duan¹

¹College of Mechanical and Vehicle Engineering, Hunan university, Changsha, 410082, People’s Republic of China
²School of Physics Science and Technology, Lingnan Normal University, Zhanjiang 524048, People’s Republic of China
³School of Physics and Astronomy, Faculty of Engineering and Physical Sciences, University of Southampton, Southampton SO17 1BJ, United Kingdom
⁴School of Electronics and Computer Science, Faculty of Engineering and Physical Sciences, University of Southampton, Southampton SO17 1BJ, United Kingdom
⁵Center for Research on Leading Technology of Special Equipment, School of Mechanical and Electric Engineering, Guangzhou University, Guangzhou 510006, People’s Republic of China
⁶Department of Physics and Optoelectronics, Taiyuan University of Technology, Taiyuan 030024, People’s Republic of China
S1. The spectral response of EDD-6 under differently polarization angle of incident light

To investigate the effect of polarization angle of incident light, we simulated the extinction spectra of EDD-6 under the polarization of incident light parallel and perpendicular to the gap. The results demonstrated that the polarization of incident light has no significant effect on the spectrum.

![Simulated extinction spectra of single EDD-6 vs incident polarization](image)

Figure S1. Simulated extinction spectra of single EDD-6 vs incident polarization

S2. The spectral response of EDD-8 when removing some parts of the EDD-8 disks

We investigated the optical response of EDD-8 with removed 1 to 3 segments. When the polarization of incident light is shown in Figure 2a, the line shape of the extinction spectra of broken EDD-8 is similar to that of complete EDD-8. The modes at each feature position are also same as the complete EDD-8. When the polarization of incident light is shown in Figure 2b, the significant Fano dip disappears, the simulated charge distribution shows that the optical response of the EDD-8 is dominated by the magnetic resonance. These results demonstrated that the generation of the Fano resonance in EDD is due to the collective resonance in EDD. Fano resonance still can be supported if some of the segments of the structure is removed under a specific polarization direction since the break of structural symmetry.
Figure S2. Simulated extinction spectra of single EDD-8 when removing 1-3 segments and corresponding modes at each feature position.