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**Interacting Dark-Resonances for Sub-Natural Spectral Response: From Atoms to Meta-Atoms**[1] PANKAJ JHA, Univ of California - Berkeley, MICHAEL MREJEN, JEONGMIN KIM, CHIHHUI WU, YUAN WANG, XIAOBO YIN, University of California, Berkeley, XIANG ZHANG, University of California, Berkeley and Lawrence Berkeley National Lab — Coherent interaction between dark-resonances have been extensively studied in atomic molecular and optical (AMO) physics to alter the interaction between atoms and electromagnetic fields. Here we theoretically investigate a classical analogue of interacting dark-resonance type physics in a plasmonic meta-molecule consisting of a radiative(bright) atom coupled to cascaded subradiant (dark) atoms. We theoretically demonstrate crude-damping limited absorptive response of the plasmonic molecule which also exhibits efficient excitation transfer within the elements. We provide numerical results in support of our analysis and develop an analytical description of the response of the meta-molecule in the limit of weak cascaded dark atoms coupling. The proposed scheme may be useful, in principle, for enhanced non-linearity, energy transport via coupled dark-resonances in plasmonics.

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