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Singular behavior of plasmon and magnetostatic resonances in samples with corners[1] RODRIGO ARIAS, Universidad de Chile — The plasmon resonances of dielectric-metallic nano-particles is a subject of interest, given their potential optical applications. Localized electrostatic fields can attain large magnitudes at specific locations and frequencies.The possibility to engineer the geometry of the particles as well as their positions in eventual arrays, may lead to metamaterials with desired optical properties. Also, we explore magnetostatic modes in the same geometry (in this geometry plasmon modes are formally special cases of magnetostatic modes). This work explores the nature of long wavelength plasmon and magnetostatic modes of nano wires with rectangular cross sections: their frequencies and shapes in this effectively 2D geometry are obtained. We use a method based on singular integral equations for the potentials in order to determine the eigenmodes and their frequencies. The modes can be classified into corner modes, and modes that oscillate inside the sample. The fields associated with the corner modes have power law singularities at the corner regions, while the modes with spatial oscillations have logarithmic singularities there. We find that numerically the eigenfrequencies are very sensitive to the right determination of the singular behavior of the fields at the corners.

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