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Stigmatic Imaging of Dielectric Nanoparticles in High Refractive Index Object Space RYAN GELLY, Boston University, Physics Department, STEVEN SCHERR, Boston University, Mechanical Engineering Department, DERIN SEVENLER, Boston University, Biomedical Engineering Department, SELIM ÜNLÜ, Boston University, Electrical Engineering Department, BENNETT GOLDBERG, Boston University, Physics Department — Dielectric nanoparticles do not lend themselves readily to popular superresolution and high-contrast techniques due to their non-resonant behavior, so more traditional optical approaches are necessary for their imaging. We explore some methods in classical optics to boost both the measured optical signal from these particles while simultaneously pushing the resolution limit past $\lambda/2.5$, even with modest objective lenses (NA=0.45). The two principal technologies that allow for such imaging are an interferometric reflectance imaging substrate (IRIS) and a solid immersion lens (SIL) with access to its aplanatic focal point. We have parameterized contrast and resolution using two parameters: the object space immersion medium refractive index and the relative index of the particle to the medium. At this conference, we will be presenting a simple physical model to describe how contrast and resolution should scale with these parameters, and then we will share imaging data for comparison. Additionally, we will discuss the methods and challenges of working with IRIS and SIL's in a research setting.

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