

While chiral plasmonic nanoparticles and nonlinear optical nanomaterials have each been extensively studied on their own, their intersection with microfluidic technologies remains largely unexplored. We examine the intersection between chiroptical plasmonics, third-order nonlinear optics, and microfluidic confinement which could lead to a single platform for next-generation biosensing. Chiral gold nanoparticles (L- and D-cysteine-functionalized AuNPs) are characterized via continuous-wave Z-scan spectroscopy to extract their nonlinear absorption (β) and nonlinear refractive index (n_2), revealing an interplay between two-photon absorption and thermally induced lensing modulated by particle chirality. Waveplate-resolved polarimetry can further quantify the enantioselective response, merging the chiral optical activity and nonlinear plasmonic behavior. Building on this characterization, we introduce a theoretical framework for operating these nanomaterials under continuous microfluidic flow, paving the way toward compact, chirality-sensitive devices, potentially combining diagnostic (biosensing) and therapeutic (photothermal) functionalities in a single platform.