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Super-resolved Microscopy via Coherent Population Oscillations KISHOR KAPALE, Western Illinois University, GIRISH AGARWAL, Oklahoma State University — We present a microscopy scheme to attain sub-nanoscale resolution based on the phenomena of coherent population oscillation (CPO). We build on the success of our earlier super-resolution methods based the phenomena of coherent population trapping (CPT). For microscopy applications it is crucial to make sure the effect being employed for super-resolution is attainable in a large class of materials. In this context, it becomes necessary to resort to a phenomena-which is similar to CPT but can be potentially observed in a larger class of materials including gases, liquids, and room-temperature solids–such as CPO. The CPO based schemes involve two-level atoms coupled to two optical fields slightly different in frequency. The CPT-like nonlinear effects such as group velocity manipulations within the CPO schemes have been observed in room temperature solids and biological samples as opposed to in atomic vapors and cold atomic gases in the case of CPT. This parallel allows us to extend our CPT-based work to CPO-based microscopy schemes and makes them attainable in much larger class of materials including solids and biological samples. We show that the CPO-based schemes offer similar resolution as the CPT-based schemes and are attainable in a larger class of materials.

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