Contribution ID: **50** Type: **Poster**

Resolution of incoherent sources beyond the Rayleigh limit by array homodyning

Resolving the separation between the incoherent point sources is one of the important problems in optical imaging. The most conventional direct imaging approach is limited by the so-called Rayleigh criterion, which restricts the resolution of two point sources if their diffraction patterns overlap significantly. Here, we explore the advantage of the array homodyning in resolving the separation between two incoherent point sources well below the Rayleigh limit. We approach the resolution problem using the well-defined notion of the Fisher information. Remarkably, in the sub-Rayleigh regime, we show that we can surpass the conventional resolution limit with a sufficiently high signal-to-noise ratio. Moreover, for small separation, it is enough to inspect a single spatial mode of light as it contains most of the information. In addition, we provide an algorithm to estimate the separation between two point sources without any prior knowledge about their spatial distribution. The algorithm is supported by a Monte-Carlo simulation.

Presenter: Dr DATTA, Chandan (Centre of New Technologies, University of Warsaw)

Session Classification: Beers and Posters