

## **Students' Annual Seminar**

### **Squaring the Triangles: Stability of colloidal crystals in dynamic laser traps**

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Stable assemblies of colloidal particle system are nowadays readily available. Ordered colloidal crystals have proven to be of great importance providing insights into the behaviour and physical properties of the solids at a fundamental level. When it comes to generate such crystals in the lab, one often seeks either of the two easily accessible techniques namely (a) using patchy/tethered colloids (b) using template, designed by an optical laser or etched onto a suitable surface. Crystals produced using the mentioned techniques have their own flaws. In the former case, once the interactions are defined, lattice obtained is fixed and cannot be changed further, whereas, the latter yields a crystal which lacks the translational invariance resulting in the loss of low energy modes. Tackling these issues, we propose a method involving video microscopy and spatial light modulation technology to stabilise a system of colloidal particles with any pairwise or many body interaction into a desired lattice symmetry. The crystal so obtained retains all the low energy modes and the symmetry of the lattice can be changed at will. We show this using our theory and Monte-Carlo simulation by stabilising a square lattice (2D) in a Gaussian Core (GC) potential. Our results can be extended to any interactions and higher dimensions.

***Tuesday, May 23<sup>rd</sup> 2017***

***4:00 PM (Tea/Coffee at 3:45 PM)***

***Seminar Hall, TCIS***