



Master Thesis Project

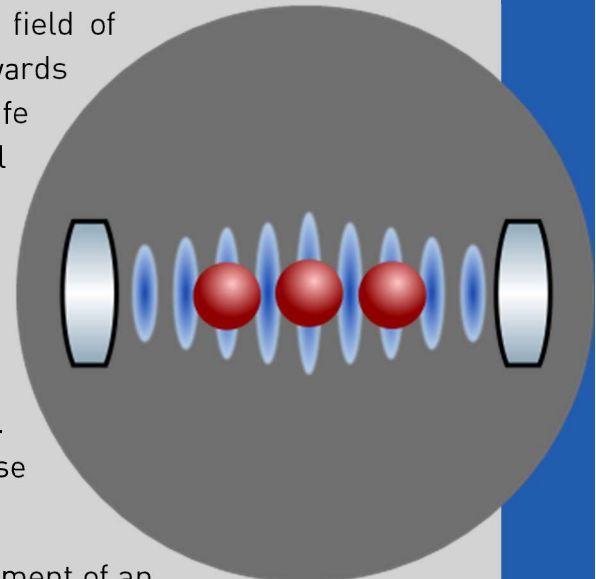
Event cameras used to detect multiple levitated nanoparticles

Prof. Romain Quidant

Nano-Photonic Systems Laboratory

We are seeking a curious and motivated master student to join our team and work on a novel optical detection technique of multiple levitated nanoparticles.

Project background – In recent years, the dynamic field of Levitodynamics has made major advances towards quantum experiments with large objects and real-life applications. Many of those optomechanical experiments are conducted with only one nanoparticle. Recent advances to trap several particles and explore their coupled dynamics are based on multiple traps, making the experiments bulky and more complex. In contrast, simple interfering standing wave traps offer the possibility to trap several nanoparticles. Nevertheless, the detection of multiple particles in these traps stills poses an unresolved issue.



Project description - Your project aims at the development of an alternative detection mechanism for nano- and micro-sized particles based on particle tracking with event cameras. These dynamic vision sensors respond to local changes, instead of capturing entire images. Each pixel operates independently, detecting local changes as they occur, making them faster than standard cameras. You will study and characterize this new technology for particle detection. Finally, you will benchmark it against standard detection technologies.

Working in our group – We offer you close supervision through PhD and Postdocs but also expect that you work independently. In your project, you will get into contact with a multitude of technologies like electronics, optics, lasers, data evaluation and vacuum technology among others. Experience in programming is beneficial but not required.

Contact: rquidant@ethz.ch or nmeyer@ethz.ch

Period: 6 months (fall Semester)

Place: ETH Zurich, CLA E11-19

