CFEL SCIENCE

# Colloquium

**16th January 2015 – 14:00**

CFEL bldg. 99 , seminar rooms I-III


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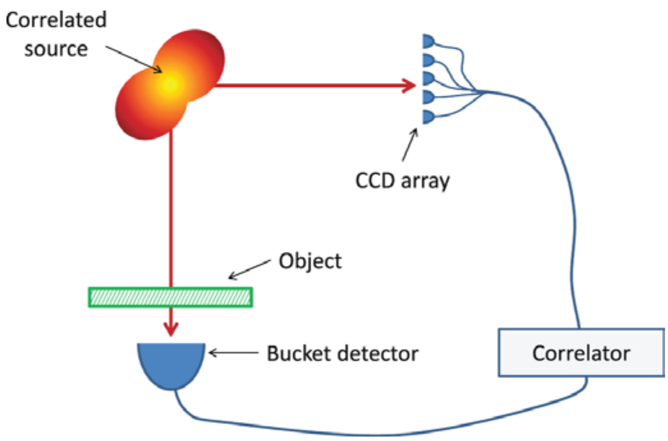
## Quantum Coherence and Imaging


Ghost imaging, either based on the coincidence measurement of entangled photon pair or based on the correlation measurement of photon-number fluctuations of randomly paired photons in thermal state, has attracted a great deal of interests. Fundamentally, we are surprised by its nonlocal behavior. Practically, the following advantages over classical imaging technology are attractive: (1) a ghost camera can “see” targets that can never be observed by classical camera; (2) the image is turbulence-free; and (3) the imaging resolution is mainly determined by the angular diameter of the light source. These aspects are particularly attractive for sunlight long distance imaging: the angular diameter of the sun is ~0.53 degree, providing in principle a turbulence-free resolution of 200μm for any object on earth at any distance without the need of huge lenses. To achieve these advantages, it is necessary to understand the physics of ghost imaging correctly. For instance, ghost imaging should be the result of the second-order coherence of light, which is in principle different from classical imaging. However, a large number of publications on “ghost imaging” are based on the first-order coherence of light. First-order coherence of light, as we all know, produces classical images. The classical approaches may never achieve the above advantages of ghost imaging. This talk will address all these problems and concerns by introducing and discussing the working mechanism and physics of ghost imaging and ghost camera, especially emphasizing the two-photon interference nature of the second-order coherence of light.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