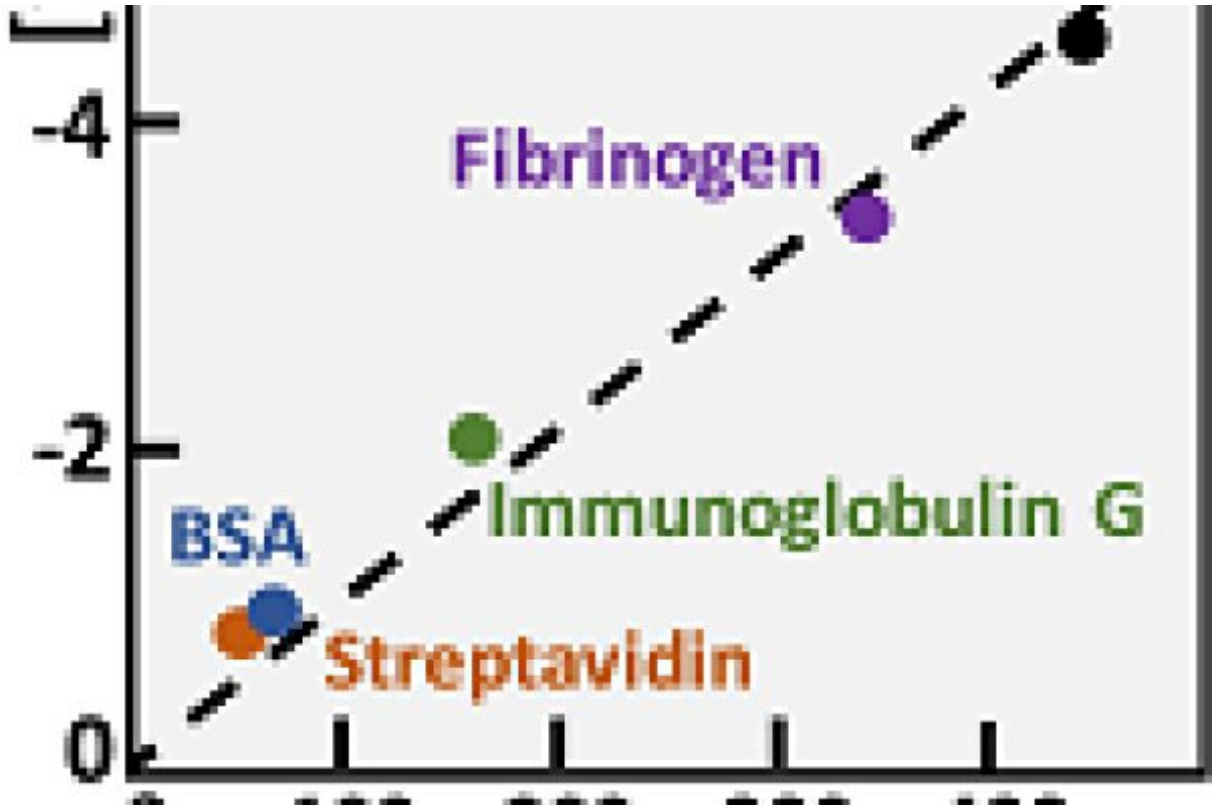


Look at that protein

Amplified interferometric scattering detection of single proteins in *NanoLetters*.

January 31, 2017

Label-free detection, analysis, and rapid tracking of nanoparticles, such as proteins, is crucial for future ultrasensitive sensing applications, yet optical techniques to distinguish nanoparticles directly among their background remain challenging. In a recent study Dr. Matz Liebel and Dr. James Hugall, in the Molecular NanoPhotonics group led by ICREA Prof at ICFO Niek van Hulst, present amplified interferometric scattering microscopy: a-iSCAT. Particle scattering and excitation reflection amplitudes are balanced by a low transmission aperture mask; as a result the interference contrast of the nanoparticle signal is amplified up to 2 orders of magnitude. This all-optical method is capable of detecting individual nanoparticles as small as 15 kDa proteins, equivalent to half a GFP or a 2 nm Au particle. Beyond high sensitivity, a-iSCAT allows high-speed image acquisition exceeding several hundreds of frames-per-second.

Liebel and Hugall showcase the performance by detecting single Streptavidin binding events and by tracking single Ferritin proteins at 400 frames-per-second with 12 nm localization precision over seconds. Due to its extremely simple experimental realization, a-iSCAT finally enables a cheap and routine implementation of label-free all-optical single nanoparticle detection platforms with sensitivity operating at the single protein level. The label-free detection method and results were published on-line 17 January 2017 in *Nano Letters*.

