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Nanooptics in the electron microscope

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The use of electron spectroscopies, especially in the scanning transmission electron microscope (STEM), for studying nanooptics has exploded in the last 10 years. STEM-Cathodoluminescence (CL), STEM electron energy loss spectroscopy (EELS) and more recently electron energy gain spectroscopy (EEGS) are rapidly evolving, fueled by many instrumental and theoretical developments. Here, we will review some of these instrumental developments in the three fields that we participated in recently.

We will present recent advances in STEM-CL made in our lab, especially in the field of quantum optics. Switching to STEM-EELS, we will present results on plasmons in sub-2 nm silver nanoparticles, a domain of intense research at the moment that were made possible thanks to an optimization of signal to noise ratio on a ~ 300 meV resolution NION USTEM. We will present the expected improvement when switching to a recently acquired sub-10 meV resolution monochromated NION STEM. Finally, first attempts to obtain EEGS, usually performed with a pulsed gun, but here without a pulsed gun, will be presented.

Choix de session parallèle

6.2 Techniques couplées et analyses multispectrales dans le domaine des matériaux

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