

## **Pump-probe spectroscopy reveals fundamental excited state dynamics of noble metal nanoparticles**

Speaker: Eduard Fron (Dept. Chemistry, K.U.Leuven, Belgium )

Noble metal clusters confined in a restricted environment such as zeolite possess remarkable absorption and emission properties, large Stokes shifts and exceptionally high external quantum efficiencies which are of paramount importance in various processes and applications. In the last years, a converging view is that the origin of their optical properties resides in their molecular-like characteristics as a result of a strong quantum confinement leading to discrete energy levels. However, these intriguing effects appear to depend not only on confinement but also on size, structure, and hydration level, charge state of the cluster and host-guest interactions. . A number of questions are frequently asked. What is the nature of the electronic transitions and especially of the long-lived emitting species? What is the physics that determines which state decays radiatively and can we map the excited state dynamics?

Here, we present various time-resolved spectroscopy techniques and how these are used to investigate the nature and dynamics of the excited states. The obtained information, together with results from earlier DFT calculations clarify the debated relationship between structure and properties and allow for an in-depth understanding of their optical properties.