

# Synthesis of nanoparticles: applications and new perspectives

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# Description

- The workshop / mini colloquium is part of the general conference [CMD2020GEFES](#) to be held in Madrid,
- Aug 31<sup>st</sup>-Sept 4<sup>th</sup> 2020
- Focus on physical synthesis techniques of nanoparticles and of their physical properties
- It consists of 3 slots, 2 hrs duration each, within the General Conferences
- Six confirmed invited speakers, 12-14 contributing speakers
- Expected audience: around 30-40 people

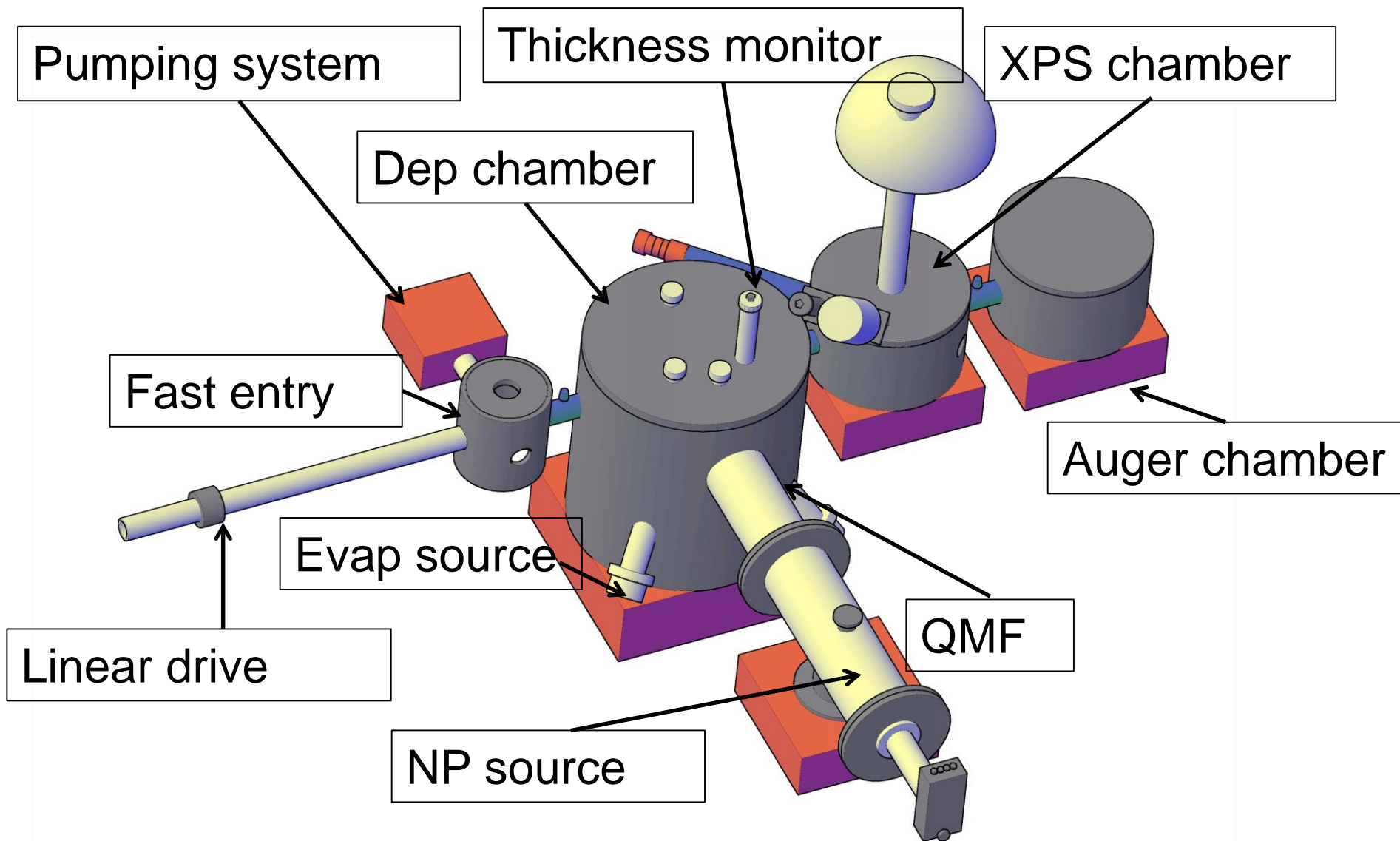




# **CMD2020GEFES**

Condensed Matter in Madrid | August 31 - September 4

<http://www.cmd2020gefes.eu/28512/programme/2020-joint-conference-of-the-condensed-matter-divisions-of-eps-cmd-and-rsef-gefes.html>

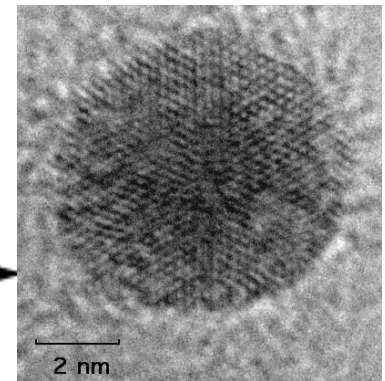
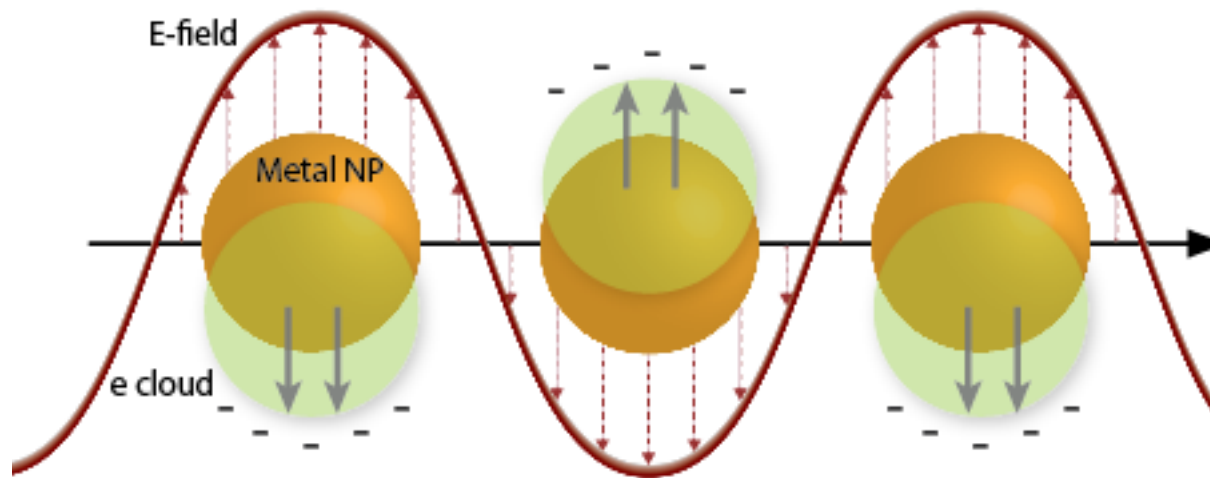


Example of NP physical synthesis apparatus: HV-UHV required!

# Just an example of application:

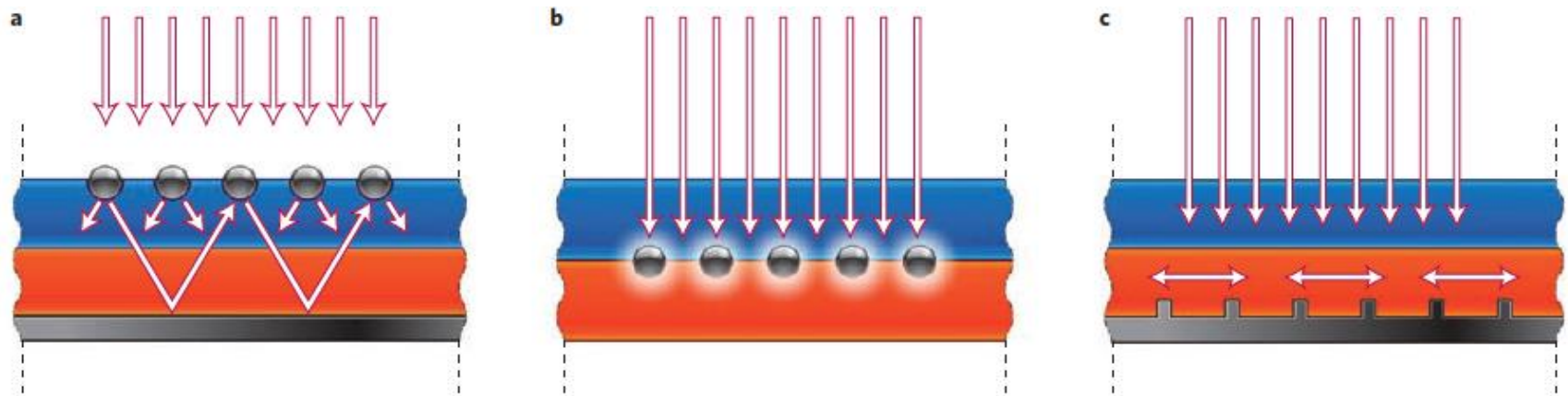
## Plasmonic NPs

When a NP is much smaller than the wave length of light, there is coherent oscillation of the conduction band electrons induced by interaction with an electromagnetic field: **Surface Plasmon Resonance (SPR)**.



TEM image of an Ag NP

# Plasmonic photovoltaics: a way to enhance sunlight absorption from a solar cell



**Figure 2 | Plasmonic light-trapping geometries for thin-film solar cells.** **a**, Light trapping by scattering from metal nanoparticles at the surface of the solar cell. Light is preferentially scattered and trapped into the semiconductor thin film by multiple and high-angle scattering, causing an increase in the effective optical path length in the cell. **b**, Light trapping by the excitation of localized surface plasmons in metal nanoparticles embedded in the semiconductor. The excited particles' near-field causes the creation of electron-hole pairs in the semiconductor. **c**, Light trapping by the excitation of surface plasmon polaritons at the metal/semiconductor interface. A corrugated metal back surface couples light to surface plasmon polariton or photonic modes that propagate in the plane of the semiconductor layer.

*H. A. Atwater and A. Polman, Nature Materials 9 (2010) 205*

# List of invited speakers

- Prof. Paolo Piseri, Università di Milano, Italy
- Dr. Lidia Martinez, ICMM-CSIC, Spain
- Prof Chris Binns, Universidad de Castilla la Mancha, Spain
- Dr. Véronique Dupuis, Université de Lyon, France
- Dr. Maria Chiara Spadaro, ICN2, Barcelona, Spain
- Prof. Hynek Biederman, Charles University, Czech Republic





# Budget

- CMD2020GEFES covers all the budget for the organization through registration, sponsorships etc.
- The invited speakers are supposed to pay the registration fee (360 €)
- We just ask IUVSTA to support our workshop by covering the registration fees only of the invited speakers (total 2160 €)

