Title : **H_2 plasma for enabling phase-transformations during *in-situ* observations of the growth in the NanoMAX transmission electron microscope**

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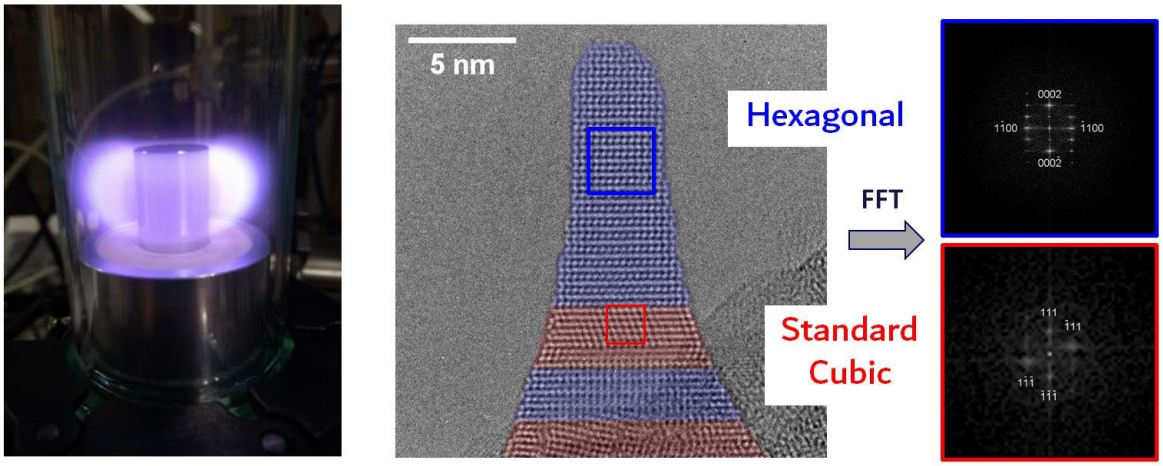
Research Area: **Material Science/Laser and Plasma Physics**

Methods : Optical emission spectroscopy (OES), Electrical probes, Electron microscopy (TEM, SEM, *In situ* TEM), other as necessary

PhD track subject: It is thermodynamics that usually determines which phases exist in given conditions and what wetting properties the surfaces have. Plasmas, however, can change the situation considerably. We are using a hydrogen electron cyclotron resonance plasma to alter surface conditions and produce novel materials and structures. One example is growing silicon nanowires in the metastable hexagonal-diamond structure. And not simply growing, but, thanks to our unique NanoMAX TEM system, also studying the growth *in-situ* in real time. Starting with accurate characterization of the plasmas, produced by an Aura-Wave source, the candidate will move to NanoMAX and into the exciting world of nanotechnology.



Plasma source in operation and atomic-resolution view of a hexagonal silicon nanowire grown *in situ* in NanoMAX.

References: https://doi.org/10.1021/acs.jpcc.1c05402; http://www.theses.fr/en/2021IPPAX020