How to See an Electron Beam

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Lasers and Accelerators for Science and Society

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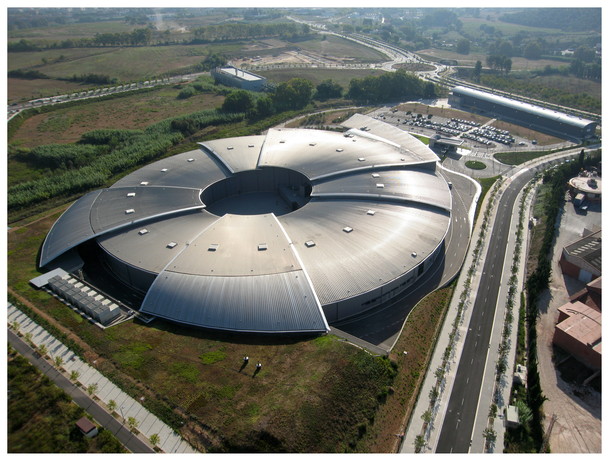
Accelerator or microscope?

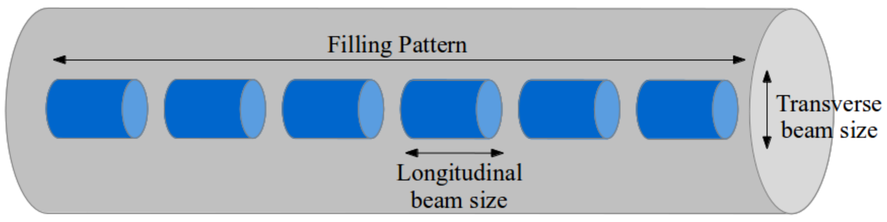
Synchrotron Light Sources are particle accelerators used to produce a special type of light that allow us to "see" better and faster. This special light is called *Synchrotron Radiation* and contains all the electromagnetic spectrum. At light sources scientists can decide which light is the best for their experiments and pick one of the accelerator experimental station.

Alba Synchrotron Light Source



Alba is a 3 GeV third generation synchrotron light source located in Cerdanyola del Vallès (Barcelona) operative since 2012. Seven experimental stations are available for external scientists (till now) and one is used to **look at the electron beam** using the visible part of the synchrotron radiation.

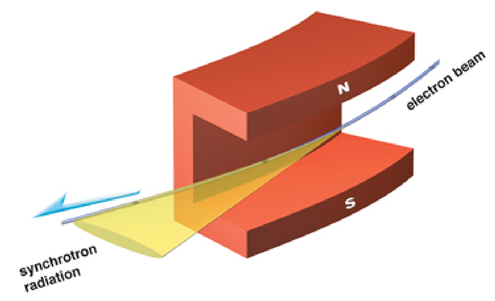
What do we want to see?

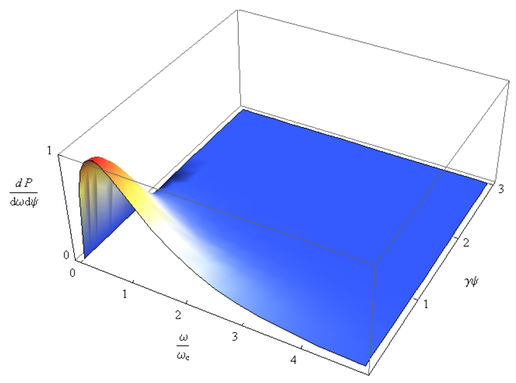


→**Transverse:** Imaging the radiation (directly or indirectly)

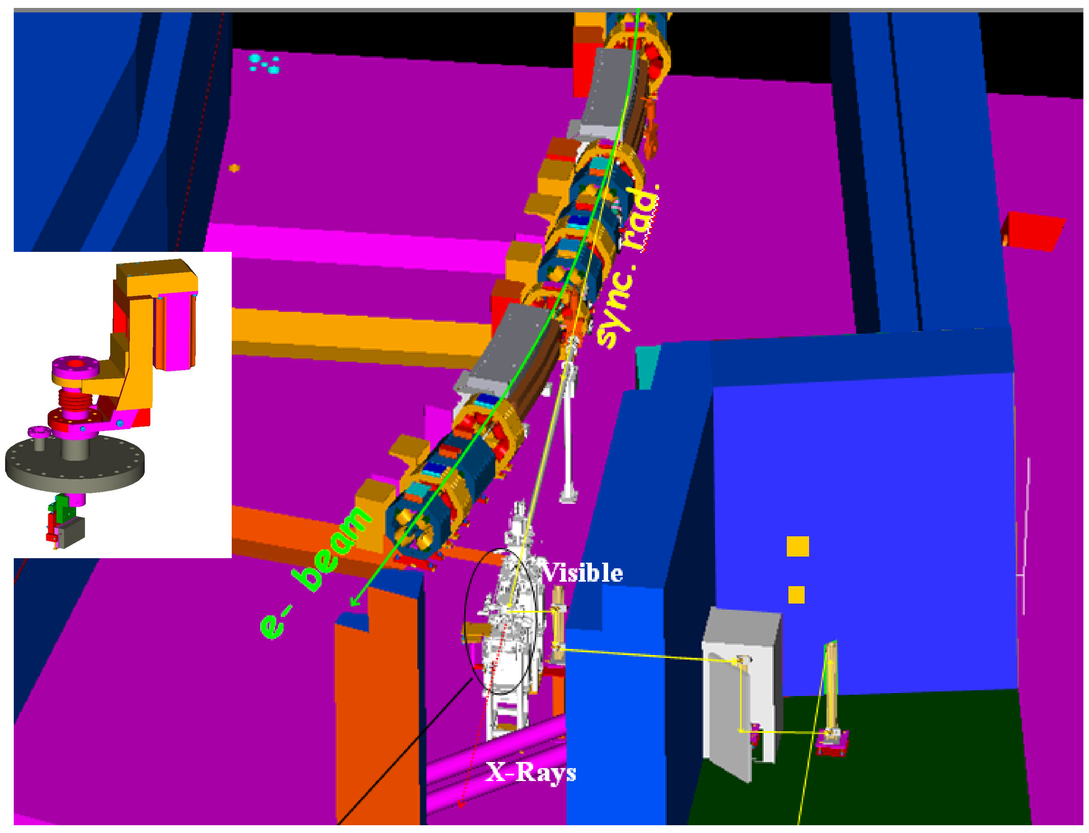
→**Longitudinal:** Temporal distribution of the radiation ⇔ temporal distribution of electrons in the beam

Light Production

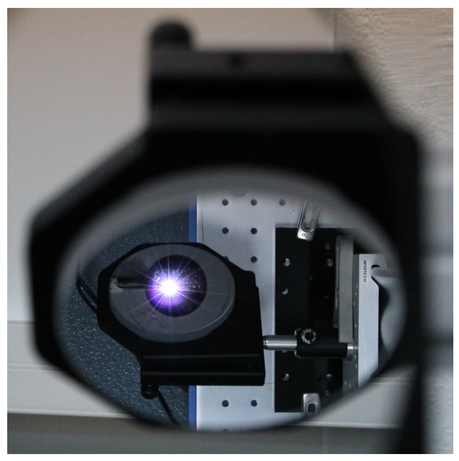


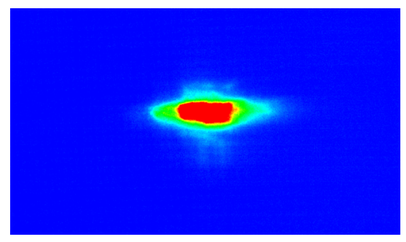


Light Transportation

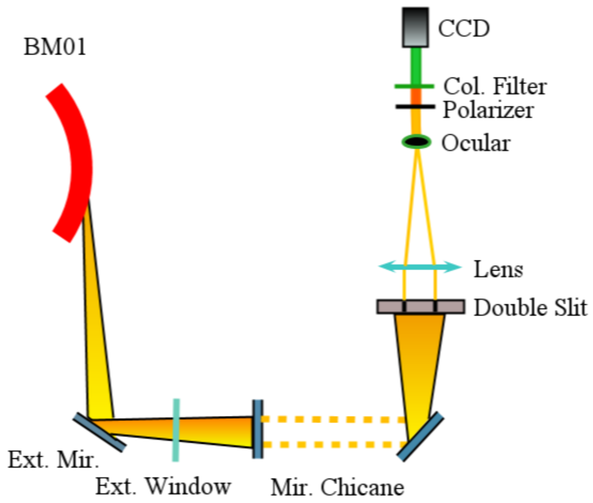


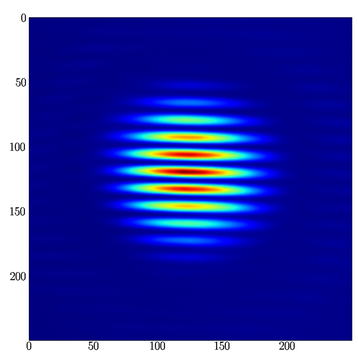
Light Extraction

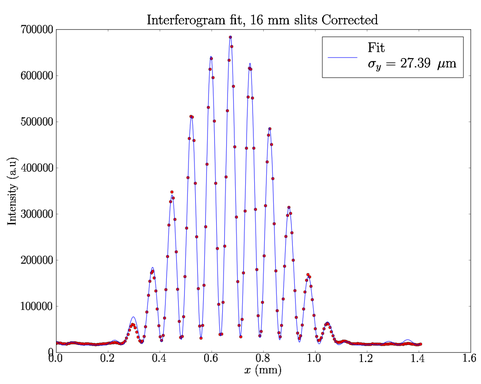




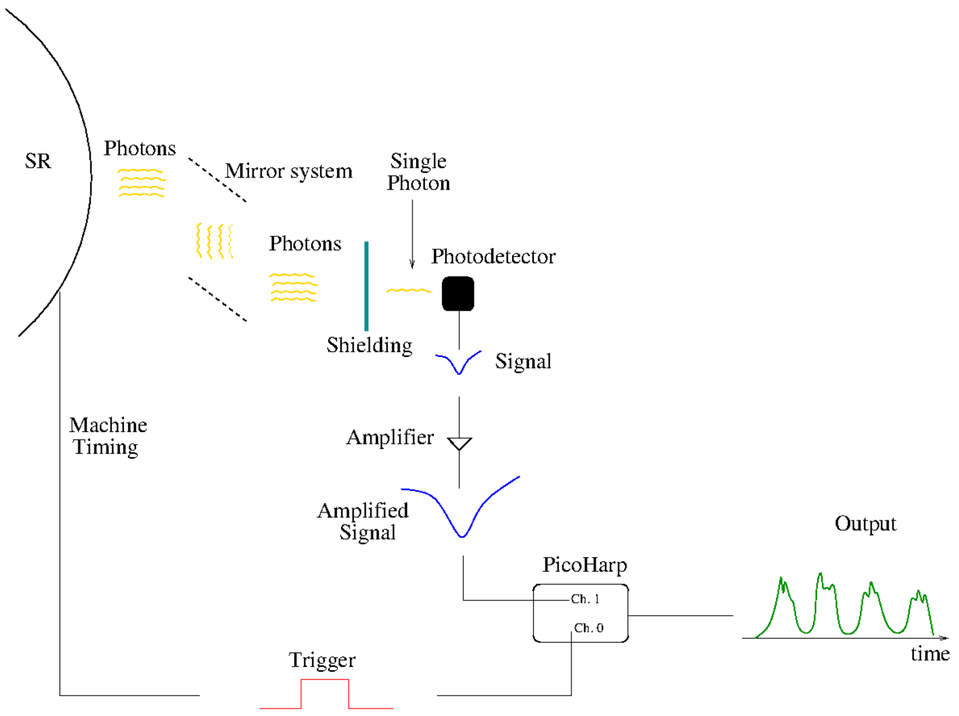
Lets Make the Light Interfere



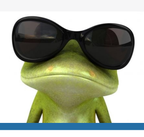




Lets Count Photons



Conclusions



We need to use special glasses to be able to see an electron beam!

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