

Beta-NMR as a novel technique using radioactive beams for biophysical studies

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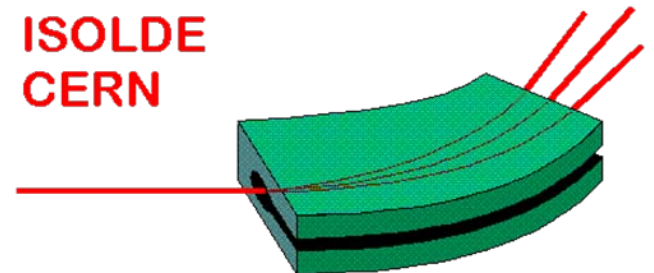
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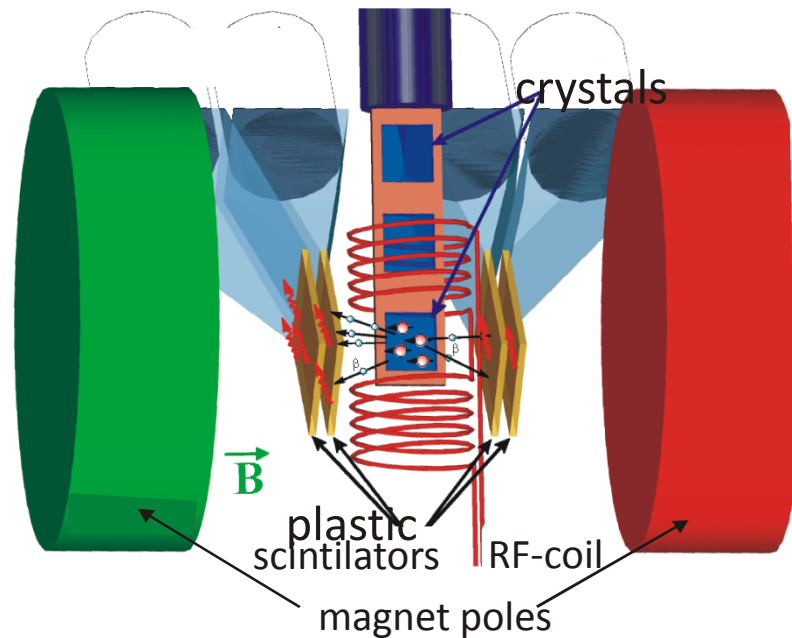
ISOLDE collaboration (CERN)



ISOLDE
CERN



β -NMR apparatus



Part of HIE-ISOLDE

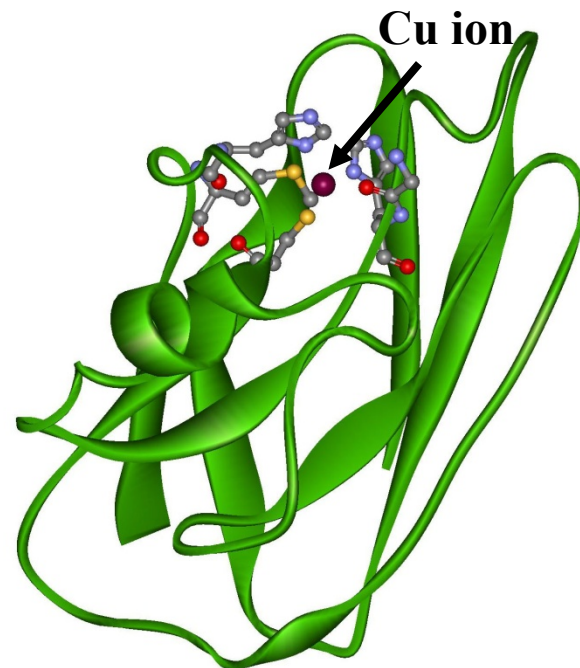
Wide variety of beams available at ISOLDE: polarised using tilted foil technique.

Big advantage over conventional NMR: **increase in sensitivity**; potentially more than 10 orders of magnitude!!

Often used in solid state physics, not yet in biophysics.

β -NMR/polarised beams: A novel technique for biophysics?

- Cu(I)/Cu(II) are essential in many **redox** processes and **electron transport** in biology, e.g. in photosynthesis.
- Cu(I) is “invisible” in most (except X-ray and nuclear) spectroscopic techniques: **a closed shell ion**
- Measurements of spectroscopic properties (such as **electric field gradients**) for Cu(I) in proteins would have considerable impact in biophysics / bioinorganic chemistry
- Other elements of particular interest: Most notably Zn (**Again, Zn(II) is a closed shell ion**), and Mn, Fe, Ni
 - All available at ISOLDE!



Azurin – an example of a Cu(I)/Cu(II) dependent electron transporting protein