



# Seminarankündigung

**Dienstag, 9. Januar 2018**

**17:15 Uhr**

**WSI, Seminarraum S 101**

## “A brief history of cross-effect DNP”

In Dynamic Nuclear Polarization (DNP), microwave irradiation at or near the electron Larmor frequency induces the transfer of electron polarization to bulk nuclei. Technological developments and the advancement of the understanding of DNP mechanisms in the past 20-30 years have enabled application of DNP to enhance the sensitivity of high-resolution magic-angle-spinning (MAS) NMR. For this purpose usually the cross-effect (CE) DNP mechanism is employed.

CE DNP was first observed in the 60's in static (non-spinning) samples. It requires two interacting electrons and in modern CE DNP/MAS NMR biradicals are used as polarizing agents. The chemical structure of these biradicals critically determines the NMR-signal enhancement. (i) We recently showed that the structure can be tuned for optimal enhancements at  $^1\text{H}$  Larmor frequencies of 600 MHz and above, where NMR resolution is highest. This is an important result, because the efficiency of DNP was believed to always decay with the strength of the magnetic field. (ii) In MAS, energy level crossings play a crucial role in CE DNP. They can lead to an increased DNP efficiency, but at the same time can cause a severe depletion of the nuclear polarization via an effect called depolarization. Clever design of biradical polarizing agents can solve this problem.

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