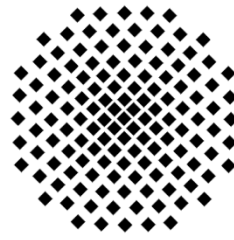


# Stuttgarter Physikalisches Kolloquium

Fachbereich Physik, Universität Stuttgart  
Max-Planck-Institut für Festkörperforschung  
Max-Planck-Institut für Intelligente Systeme

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Dienstag, 29. Mai 2018

17:15 Uhr

Hörsaal V 57.01

Universität Stuttgart, Pfaffenwaldring 57, 70569 Stuttgart-Vaihingen

Gastgeber: Prof. Gert Denninger, Universität Stuttgart, Telefon: 0711 - 685-65269

## From Laser physics to the para-hydrogen pumped Raser

**Stephan Appelt**

RWTH Aachen & FZ Jülich

### Abstract

In this lecture, I will bridge the fundamental concepts from the Laser theory described by H. Haken to the recently discovered Para Hydrogen ( $p\text{-H}_2$ ) fueled Raser. Various experiments showing multi-mode operation of a Raser based on SABRE pumped organic molecules are presented. The different Raser modes show the  $J$ -coupling structure of the nuclear spins of the rasing molecules with unprecedented precision. This sort of NMR is virtually free of  $T_2$  relaxation and we have achieved at present some 10 micro-Hertz resolution. The applications range from mobile molecular analysis, new magnetic sensors to amplifiers, fundamental physics and quantum computing.