

FELIX Facility Nijmegen: molecular physics with intense radiation from 0.2 to 100 THz

W.J. van der Zande¹

¹*Radboud University Nijmegen, Institute for Molecules and Materials, FELIX Facility, Nijmegen, The Netherlands*

Presenting Author: w.vanderzande@science.ru.nl

The FELIX facility Nijmegen is the result of two initiatives. An investment in semi-large research infrastructures, complementing a High Field Magnet Laboratory (HFML) with an intense THz light source and the move of staff and instrumentation of the successful FELIX facility from a FOM-Institute elsewhere to the Radboud University Nijmegen. In September 2011, the THz FEL, called FLARE, showed first lasing, in 2012, the first of three Free Electron Lasers in the IR to FIR region moved to Nijmegen was commissioned. While two remaining FEL beamlines are still constructed, user operation has resumed as of July 2013, delivering photons from 200 GHz (1500 μm) to 80 THz (4 μm) in intense picosecond pulses. In my talk, I will present the rationale behind the funding and operation of our FEL facility and their potential place in the field of atomic and molecular physics. I will report on the operation of the THz FEL. The ambition of the FELIX facility is to use the far infrared or THz part of the spectrum to unravel the dynamics of molecules at low frequencies in which large parts of molecules exhibit coherent motion. A significant part of the molecular research at our FELIX facility is aimed at determining molecular structures of ions or molecules using so-called action spectroscopy. One of the ambitions is to use these structural identifications to determine how nature has been able to develop molecular machinery that under isothermal conditions can employ the metastability of ATP to build new complex molecules and make molecular motors possible.