

**Ultrashort optical pulses and quantum objects**  
**– How the Nobel Prizes 2023 link to the Institute of Laser and Optics, Emden**

The generation of extreme short, i.e. attosecond (1attosecond =  $10^{-18}$  second) laser pulses and their application in science have very recently been rewarded with the Nobel prize in Physics in 2023. The outstanding work by the three Nobel laureates Pierre Agostini, Ferenc Krausz and Anne L’Huillier have paved the way for the investigation of fundamental physical phenomena in atoms and molecules on extreme short time scales.

In a second step the committee has rewarded Mounji G. Bawendi, Louis Brus, and Alexei I. Ekimov with the Nobel prize in Chemistry for their discovery and synthesis of quantum dots. The astonishing optical properties of these nanometer-sized objects are fundamentally determined by quantum effects. Nowadays these quantum dots have already found their way into our daily life e.g., in the last generation of QLED displays.

In my talk addressed to a broader audience I will present the scientific background of both Nobel prizes and how parts of these scientific breakthroughs are linked to the optical laboratories of the Institute of Laser and Optics (ILO) at the University of Applied Sciences Emden/Leer.