
Contribution ID: **20** Type: **Oral**

# Direct observation of excitonic dephasing by time- and angle-resolved photoelectron spectroscopy

*Thursday, April 18, 2024 4:15 PM (30 minutes)*

Coherent light matter interaction plays a pivotal role in future quantum technologies. The dephasing of electronic excitations in condensed matter system proceed on ultrashort time scales due to microscopy many body interactions and can only be indirectly measured by linear spectroscopies, whereas nonlinear optical methods do no provide momentum resolution. In this talk I will discuss ARPES experiments employing a double coherent pulse excitation, in a prototypical bulk transition metal dichalcogenide semiconductor (bulk 2H:Wse2). This material exhibits a very fast excitonic dephasing due to its indirect bandgap (inderectly estimated to be <20 fs on the surface [1]). Theoretical analysis demonstrate that the temporal envelope of ARPES interferograms collected with our methos is directly related to the microscopic dephasing time. We experimentally collect interferograms at the K point, the location in reciprocal space of A excitons. Results are fitted by a microscopic theory based on Bloch equations, leading to a dephasing time of 15 fs.
[1] Dong et al, https://doi.org/10.1002/ntls.10010

**Primary author:** PUPPIN, Michele (EPFL)

**Presenter:** PUPPIN, Michele (EPFL)