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# Observation of structural dynamics of 1T-TiSe<sub>2</sub> using femtosecond electron diffraction

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## Abstract content <br>   (Max 300 words)

Trilayered transition metal dichalcogenides such as our sample 1T-TiSe<sub>2</sub> have been studied for many years as systems with strong electron-electron and electron-phonon correlations. The main attraction to this family of compound is its potential to exhibit a ground state phenomenon known as charge density waves whose detailed physical origin has been controversially determined.
We shall be using an ultrafast femtosecond laser based on pump-probe technique, namely ultrafast electron diffraction, to investigate some of the noble features associated with this crystal.
A pump laser pulse excites the crystal from its ground state and the probe pulse (ultrashort electron pulse) takes the snapshot of this evolution of the lattice generating an electron diffraction pattern of this crystal. Hence the dynamical structural behaviour can be observed in time with a subpicosecond temporal resolution. As a hexagonal close-packed structure, its signature is expected to be seen in the diffraction pattern as has been observed by Woo et al in steady state transmission electron diffraction. Time-resolved measurements as well as the behaviour of the charge density wave for various pump fluences shall be investigated. We investigate the suppression of the charge density wave (CDW) order, measure the electron-phonon coupling time, and determine the CDW recovery process. With sufficient pumping fluence we might see a high temperature CDW phase appearing in the diffraction patterns.

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## Apply to be<br> considered for a student <br>   award (Yes / No)?

Yes

## Level for award<br> (Hons, MSc, <br>   PhD)?

MSc

## Main supervisor (name and email)<br>and his / her institution

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## Would you like to <br> submit a short paper <br> for the Conference <br> Proceedings (Yes / No)?

No

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