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# Novel mechanisms of electric dipole moments in atoms and molecules

*Thursday 1 September 2022 16:30 (30 minutes)*

I discuss novel mechanisms for the generation of electric dipole moments in atoms and molecules, including via the exchange of low-mass axionlike particles between atomic electrons and nucleons **[1,2]**, as well as via two-photon exchange processes between atomic electrons and the nucleus in paramagnetic systems **[3]**. I also discuss how oscillating electric dipole moments may be induced by an oscillating-in-time axionlike dark matter field **[3,4]**. Such oscillating electric dipole moments have recently been sought by using ultracold neutrons **[5]** and HfF+ molecular ions **[6]**.

**References**

**[1]** Stadnik, Dzuba and Flambaum, Physical Review Letters **120**, 013202 (2018).
**[2]** Dzuba, Flambaum, Samsonov and Stadnik, Physical Review D **98**, 035048 (2018).
**[3]** Flambaum, Pospelov, Ritz and Stadnik, Physical Review D **102**, 035001 (2020).
**[4]** Stadnik and Flambaum, Physical Review D **89**, 043522 (2014).
**[5]** Abel *et al.* (nEDM collaboration), Physical Review X **7**, 041034 (2017).
**[6]** Roussy *et al.*, Physical Review Letters **126**, 171301 (2021).

## Scientific topic

Symmetries

**Author:** Dr STADNIK, Yevgeny (Kavli IPMU, University of Tokyo)

**Presenter:** Dr STADNIK, Yevgeny (Kavli IPMU, University of Tokyo)

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