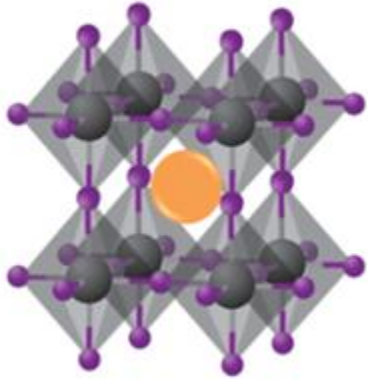


Exciton properties of the MAPbI₃ single crystal

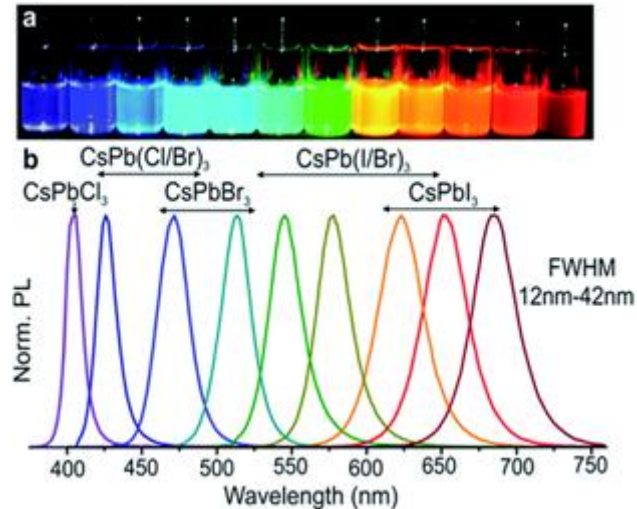
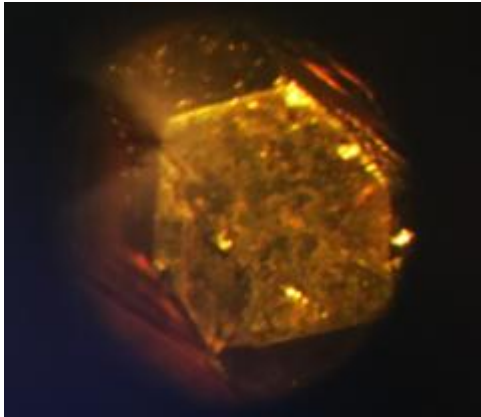
Mamaeva M. P., Murzin A. O., Kapitonov Yu. V., Emeline A. V., Selivanov N. I.

Saint-Petersburg State University
Department of Photonics

Halide perovskites



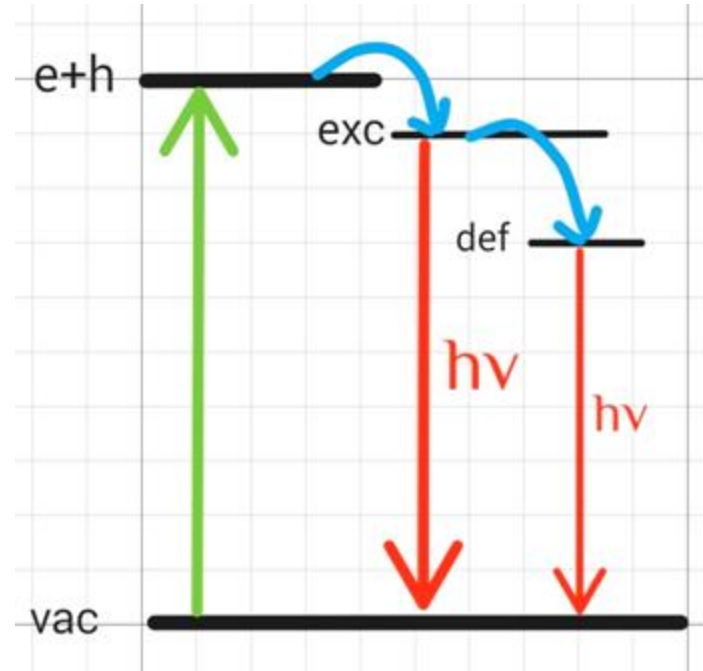
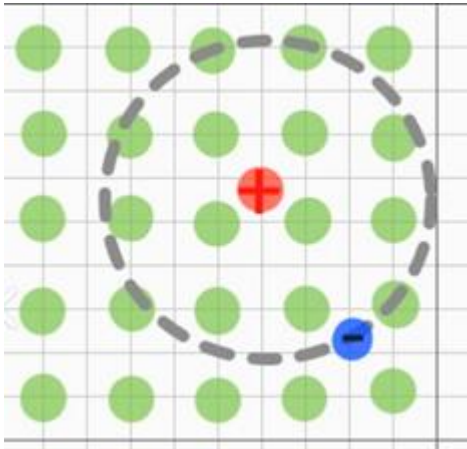
- Structure ABX_3 ($X = I, Br, Cl$)
- Direct-gap semiconductor
- Defect resistance
- Potential application: solar energy, LEDs, radiation detectors.



Son-Tung Ha et al, Metal halide perovskite nanomaterials: synthesis and applications

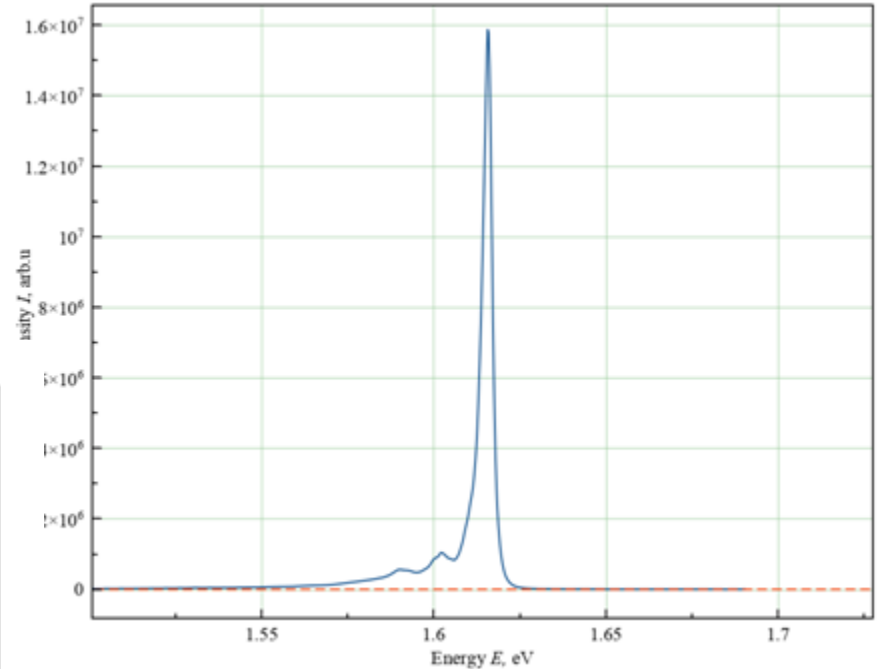
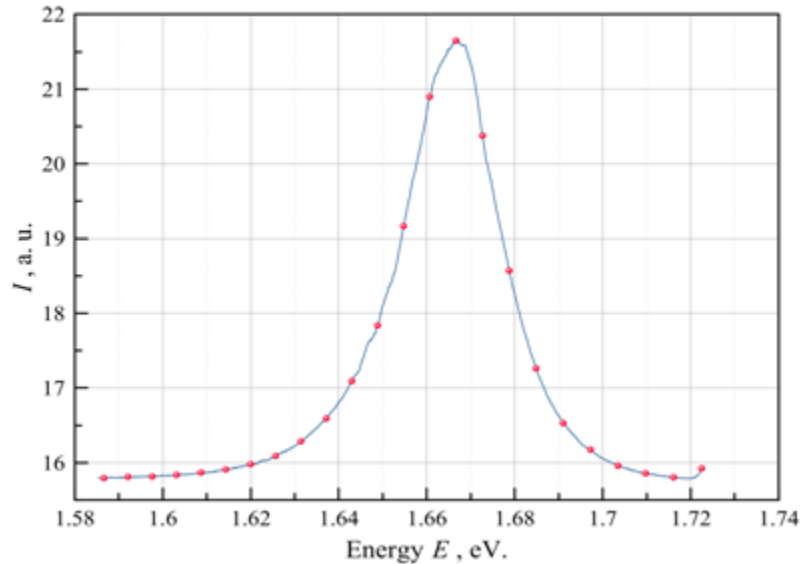
Excitons

An exciton is a quasiparticle formed as a result of the Coulomb interaction of an electron and a hole.

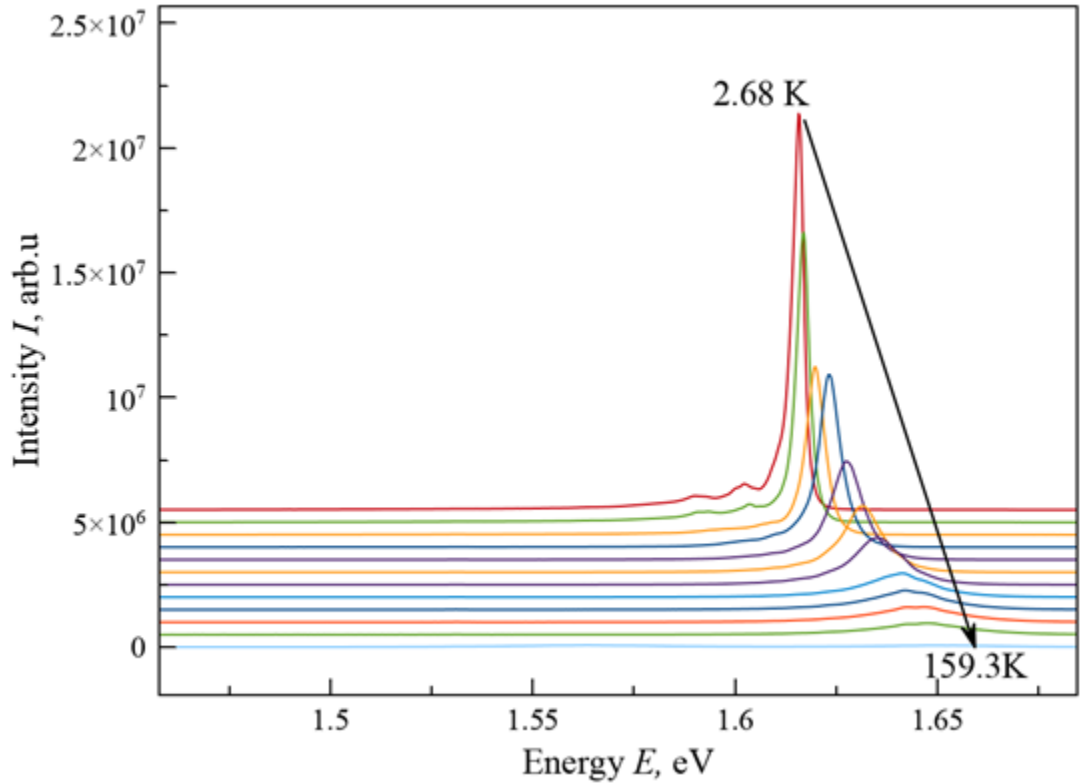


Goals of work

- Evaluate inhomogeneous broadening
- Evaluate lower bound for the exciton binding energy

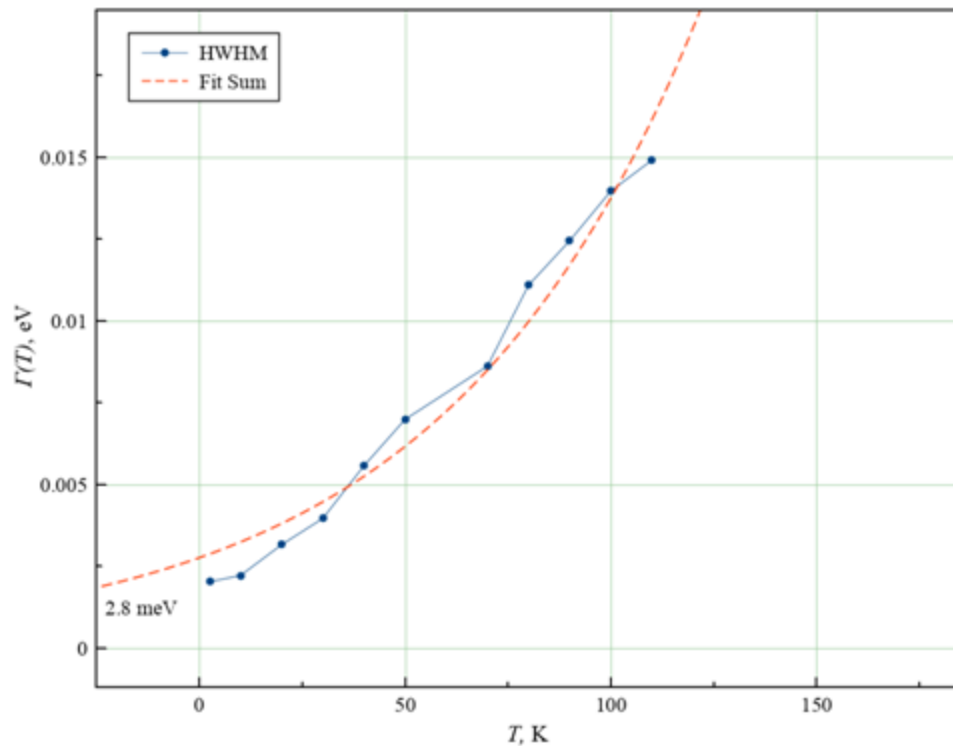
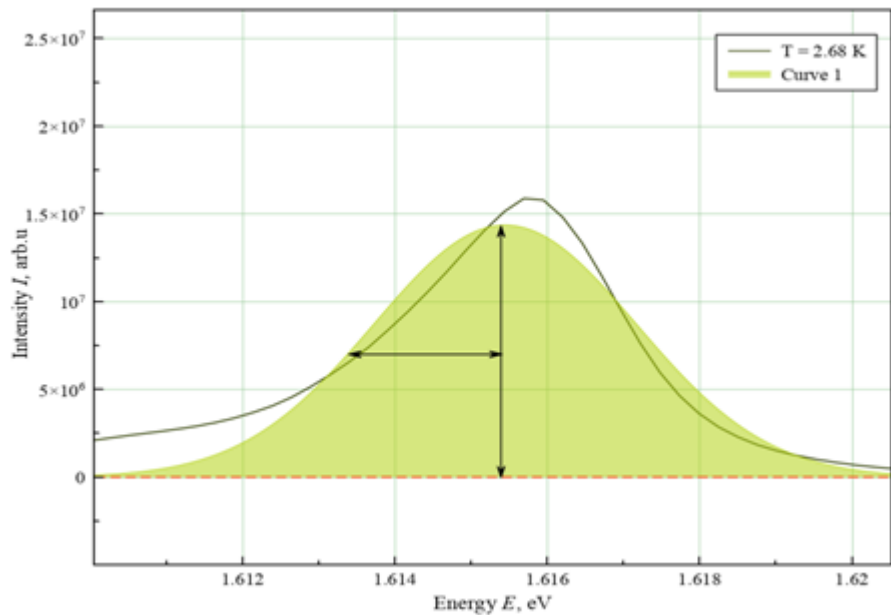


Research method

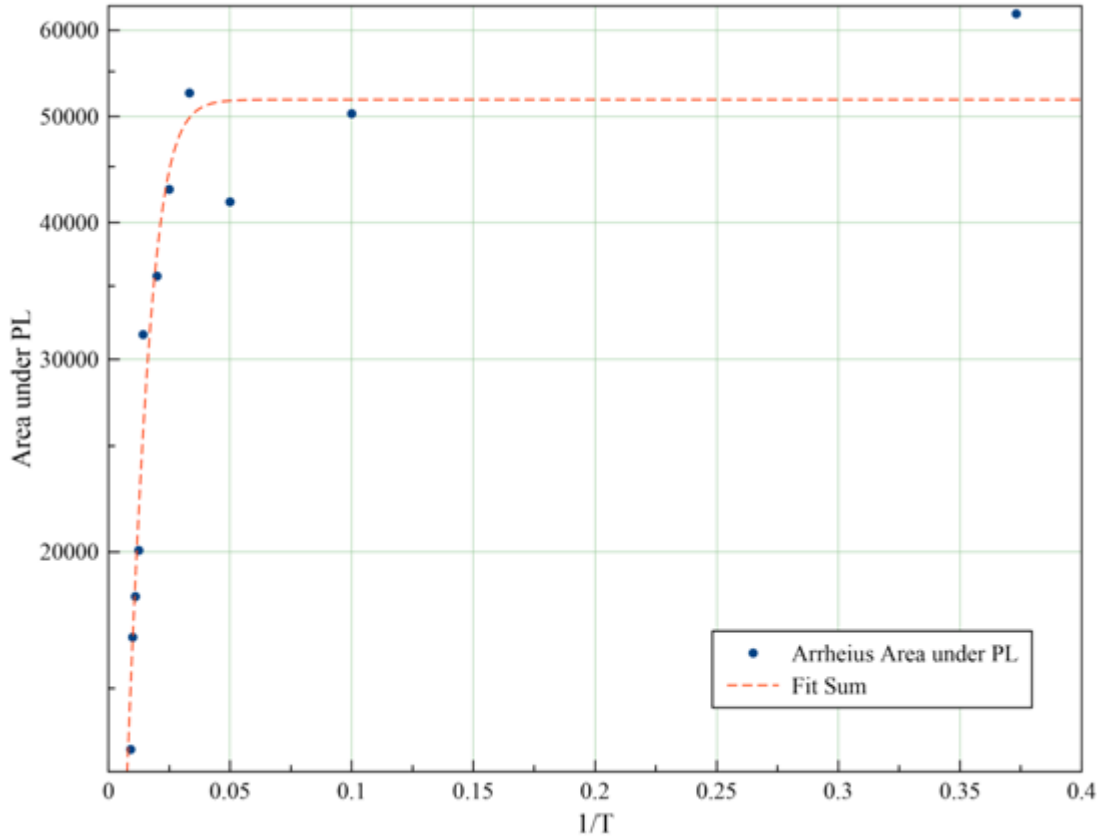


Results

$\Gamma \sim 2.8$ meV



Results



$$I(T) = \frac{I(0)}{[1 + C \exp(-E_a/k_B T)]}$$

$$E_a \sim 14.8 \text{ meV}$$

Thank you for your attention!



Instagram: [@photon.sphu](https://www.instagram.com/photon.sphu)