



Department of Physics

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Colloquia

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Experimental and theoretical investigation of dopant-driven color change in perovskite crystals

In my talk, I'll present our recent results on Cesium lead perovskites which are suitable materials for various optoelectronic applications due to their exceptionally good optical properties. The effect of Mn doping on the structural and optical properties of cesium lead halide perovskite crystals are investigated from both experimental and theoretical points of view. It is found that adding MnCl_2 during the synthesis not only leads to a Mn-driven structural phase transition from Cs_4PbBr_6 to CsPbCl_3 but also triggers the Br^- to Cl^- halide exchange. On the other hand, it is observed that, under UV illumination, the color of Mn-doped crystals changes from orange to blue in approximately 195 h. While the intensity of Mn-originated photoluminescence emission exponentially decays in time, the intensity of CsPbCl_3 -originated emission remains unchanged. In addition, diffusive motion of Mn ions results in both a growing population of MnO_2 at the surface and transition of the host into a cesium-rich Cs_4PbCl_6 phase.

Hasan Sahin was born in 1980 in Berlin, Germany. He completed his primary, secondary and high school education in Mersin and received his BS and MS degrees from Department of Physics, Ankara University. He received his PhD from the Bilkent University Institute of Materials Science and Nanotechnology in 2011. Since 2016 he has been working at Department of Photonics in Izmir Institute of Technology. Dr. Şahin's team is working on theoretical and experimental investigation of electronic, magnetic, quantum transport, phononic and optical properties of materials. Dr. Şahin has been contributed to more than 95 scientific publications (7700 citations and h-index: 34). Şahin was awarded by Marie-Curie scholarship in 2012-2015, BAGEP in 2016, FABED in 2016, TÜBA GEBİP in 2017, METU Parlar Foundation in 2017 and TÜBİTAK TEŞVİK in 2018. Recent projects carried out by Dr. Şahin's group (CENT | Computational & Experimental NanoTechnology) have focused on the theoretical and experimental investigation of new generation perovskite crystals and ultra-thin heterostructures.



February 27
Wednesday



UNAM
SU-01



15:40

The Department of Physics Seminars are designed to address a non-specialist, broad audience and introduce topics of contemporary research through lectures by leading experts. We warmly invite all members of the student body, including undergraduates enrolled in any programme.

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