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## **[403] Transition from superfluorescence to amplified spontaneous emission in halide perovskite giant nanocrystals**

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Cooperative effects among electric dipoles lead to drastic changes in photon emission processes. Particularly, two types of cooperative emission, namely superfluorescence (SF) and spontaneous amplified emission (ASE), dominate the emission process from highly excited materials. Here, we investigated the photoluminescence (PL) dynamics in halide perovskite giant nanocrystals to scrutinize the contribution from the two cooperative processes. From the results of time-resolved PL spectroscopy, we observed that the dominant process gradually evolves from SF to ASE by increasing the temperature. Besides, we found the crossover regime of the two processes at the intermediate temperature of the transition. Our results will lead to a comprehensive understanding of cooperative effects in light-matter interactions.

**Primary author:** Mr KOBIYAMA, Etsuki (IBM Research Europe–Zürich)

**Co-authors:** Ms BEREZOVSKA, Yuliia (Institute of Inorganic Chemistry, Department of Chemistry and Applied Biosciences, ETH Zürich, Laboratory for Thin Films and Photovoltaics, Empa ); Ms ZHU, Chenglian (Institute of Inorganic Chemistry, Department of Chemistry and Applied Biosciences, ETH Zürich, Laboratory for Thin Films and Photovoltaics, Empa ); Dr BÖHME, Simon (Institute of Inorganic Chemistry, Department of Chemistry and Applied Biosciences, ETH Zürich, Laboratory for Thin Films and Photovoltaics, Empa ); Dr RAINÖ, Gabriele (Institute of Inorganic Chemistry, Department of Chemistry and Applied Biosciences, ETH Zürich, Laboratory for Thin Films and Photovoltaics, Empa ); Dr BODNARCHUK, Maryna (Institute of Inorganic Chemistry, Department of Chemistry and Applied Biosciences, ETH Zürich, Laboratory for Thin Films and Photovoltaics, Empa ); Prof. KOVALENKO, Maksym (Institute of Inorganic Chemistry, Department of Chemistry and Applied Biosciences, ETH Zürich, Laboratory for Thin Films and Photovoltaics, Empa ); Dr MAHRT, Rainer (IBM Research Europe–Zürich); Dr STÖFERLE, Thilo (IBM Research Europe–Zürich)

**Presenter:** Mr KOBIYAMA, Etsuki (IBM Research Europe–Zürich)

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