



**UNIVERSITÉ  
DE GENÈVE**

**FACULTÉ DES SCIENCES**

**LE DEPARTEMENT DE CHIMIE PHYSIQUE**

*a le plaisir de vous inviter à la*

**CONFERENCE**

*Intitulée*

**WHAT ARE HIGHrISC EMITTERS?  
AND ARE THERE MANY?**

*donnée par*

**Prof. Dr. Peter GILCH**  
HEINRICH HEINE UNIVERSITY DUSSELDORF (HHU)

**le MARDI 10 MARS à 16h30**

**SALLE 1S081  
Sciences III**

30 quai Ernest-Ansermet ou 4 bld d'Yvoy

**Responsable : Dr. Ricardo J. Fernández-Terán**

## What are HIGHrISC Emitters? And are there Many?

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After a brief summary of our research activity, I will introduce the HIGHrISC approach. In the HIGHrISC<sup>1</sup> aka hot exciton<sup>2</sup> process, reverse intersystem crossing (rISC) from a higher triplet state populates a (bright) singlet excitation. This is, *inter alia*, of interest for OLEDs in which HIGHrISC may allow the “processing” of triplet excitons generated by electron-hole recombination. We have demonstrated HIGHrISC behavior for the closely related aromatic carbonyls xanthone, thioxanthone, and acridone. Spectroscopic evidence for HIGHrISC - resting on direct and sensitized excitation - will be reviewed. Supporting quantum chemical results from the Marian group<sup>3</sup> will also be touched. Our joint activities with the Czekelius group<sup>4</sup> to boost the performance of HIGHrISC emitters by intra- and intermolecular adjustments will be summarized. The talk will end with indications that HIGHrISC is not so rare in organic chromophores.

(1) Thom, K. A.; Wieser, F.; Diestelhorst, K.; Reiffers, A.; Czekelius, C.; Kleinschmidt, M.; Bracker, M.; Marian, C. M.; Gilch, P. Acridones: Strongly Emissive HIGHrISC Fluorophores. *J. Phys. Chem. Lett.* **2021**, *12* (24), 5703-5709. DOI: 10.1021/acs.jpcclett.1c01381.

(2) Xu, Y.; Xu, P.; Hu, D.; Ma, Y. Recent progress in hot exciton materials for organic light-emitting diodes. *Chem. Soc. Rev.* **2021**, *50* (2), 1030-1069. DOI: 10.1039/d0cs00391c.

(3) (a) Rai-Constapel, V.; Villnow, T.; Ryseck, G.; Gilch, P.; Marian, C. M. Chimeric Behavior of Excited Thioxanthone in Protic Solvents: II. Theory. *J. Phys. Chem. A* **2014**, *118* (50), 11708-11717. DOI: 10.1021/jp5099415. (b) Bracker, M.; Marian, C. M.; Kleinschmidt, M. Internal conversion of singlet and triplet states employing numerical DFT/MRCI derivative couplings: Implementation, tests, and application to xanthone. *J. Chem. Phys.* **2021**, *155* (1), 014102. DOI: 10.1063/5.0056182.

(4) Jantz, M.; Klaverkamp, D.; Bunnemann, L.; Kleinschmidt, M.; Czekelius, C.; Gilch, P. Substituted acridones: simple deep blue HIGHrISC emitters in an aprotic environment. *Phys. Chem. Chem. Phys.* **2025**, *27* (20), 10444-10455. DOI: 10.1039/d4cp04781h