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Abstract for an Invited Paper
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Molecular aggregates in cavities: topological phases and novel chemical reactivities.

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In this talk, I will discuss the development of nontrivial topological phases in hybrid photon-exciton systems which gives rise to one-way robust energy transport in the presence of disorder. I will also discuss recent theoretical work discussing how thermodynamics and kinetics of molecular processes can be nontrivially altered when organic dye aggregates strongly interact with confined electromagnetic fields. I will discuss some generalizations of transition state theory that are suitable to polariton ensembles, and which may give rise to unprecedented control of chemical reactivity.