Title: Semiconductor Disk Lasers with Gain-Embedded Meta-Mirrors
Electronics, Photonics and Quantum Materials

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As adversaries continue to develop and field new hypersonic weapons, it is imperative the US over-match these threats with the design of superior supersonic and hypersonic propulsion systems. However, for the US to safely design these systems on timescales competitive with our rivals, we must better understand the complex physics and chemistry that govern propulsion performance. To address these technology gaps, Drs. Cornell and Higgs will collaborate with the Hanson Research Group of Stanford University – a world leader in optical diagnostics and combustion research – to develop 1) the world's first active multiscale kinetic model for solid fuels and 2) novel optical diagnostics well suited for high-enthalpy environments to help modernize the DoW's approach to hypersonic propulsion system design. The technologies developed here are not only critical to Army research but will help support fundamental and applied research programs across the DoW that aim to address the most pressing Critical Technology Areas.