"Waveguide amplifiers and lasers in rare-earth-doped potassium double tungstates"

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Abstract:

In this seminar I will discuss rare-earth-doped channel waveguide amplifiers and lasers based on a family of monoclinic crystalline materials, potassium double tungstates. By liquid-phase epitaxy we grow thin layers co-doped with Gd, Lu, and Y to simultaneously achieve lattice matching and high refractive-index contrast with the Y-containing substrate, as well as high doping concentrations of active rare-earth ions such as Yb or Tm. We demonstrated a small-signal gain per unit length of ~1000 dB/cm, which is two orders of magnitude higher than previously reported in the literature for any rare-earth-doped material and comparable with semiconductor optical amplifiers, as well as lasers with slope efficiencies of 80%, reaching the absolute theoretical limit for the involved transitions.