

10<sup>th</sup> May 2012 - 10:00  
Building 49, room 108

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Rare earth doped  $\text{Lu}_2\text{O}_3$   
for diode pumped 1, 2, and 3  $\mu\text{m}$  lasers

The cubic sesquioxide material  $\text{Lu}_2\text{O}_3$  is a highly interesting host material for high power diode pumped laser operation of different rare earth doping ions due to its excellent thermo-mechanical properties. Moreover, it provides higher absorption cross sections and wider emission bandwidth than the standard material YAG when doped with  $\text{Yb}^{3+}$ -ions. These properties make  $\text{Yb:Lu}_2\text{O}_3$  ideally suited for cw and modelocked high power thin disk lasers. In cw laser operation 0.5 kW with nearly 75% optical conversion efficiency were obtained with this material in the thin disk laser geometry, whereas record high average output powers exceeding 100 W were realized with sub-picosecond pulse durations from SESAM modelocked thin disk lasers. At 10-W-level output powers and pulse durations below 200 fs the output was stable enough to detect the CEO frequency. The very similar atomic mass of Lutetium compared to other heavy rare earth metals makes  $\text{Lu}_2\text{O}_3$  an excellent host material also for Ho, Tm, and Er-ions allowing for efficient high power laser operation in the 2 and 3  $\mu\text{m}$  wavelength range. The talk will give an overview over our latest results and further prospects in these fields.

