Optical Materials 2001 vol.16 N1-2, pages 233-242

4f2 to 4f5d excited state absorption in Pr3+-doped crystals

Nicolas S., Descroix E., Guyot Y., Joubert M., Abdulsabirov R., Korableva S., Naumov A., Semashko V.

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

We first report one photon classical spectroscopy of Pr3+-doped LiLuF4 single crystals which leads to the energy level diagram for Pr3+ levels in this host and to the 1D2 and 3P0 emitting level lifetimes. Then, excited state absorption (ESA) spectra from these metastable levels to 4f5d states are presented and the ESA cross-sections are in the order of 10-18 cm2. Subsequently, such upconversion excitation into the 4f5d states of Pr3+ is used to generate the broad band 4f5d to 4f2 UV fluorescence. Moreover, an energy transfer from Pr3+ 4f5d states to Ce3+ 5d states is clearly identified.

http://dx.doi.org/10.1016/S0925-3467(00)00083-5