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## Optical Properties of Yb : Lu<sub>3</sub>Al<sub>5</sub>O<sub>12</sub> Crystal Irradiated by 4.5-MeV Si Ions

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Compact waveguide laser sources emitting at wavelength around  $1.0\mu\text{m}$  are interesting in a multiple of application. In present work, we demonstrate a crystalline waveguide in Yb:Lu<sub>3</sub>Al<sub>5</sub>O<sub>12</sub> (Yb:LuAG) crystal irradiated by 4.5-MeV Si ions at fluences of  $1.0 \cdot 10^{15} \text{ cm}^{-2}$ . A typical „barrier-confined“ waveguide geometry is confirmed by performing the prism-coupling measurement at a wavelength of 632.8 nm with transverse electric (TE) polarization, and the refractive index profile is proposed based on the dark-mode plots. Under excitation at 930 nm, the peak emission at 1030 nm is generated with a bandwidth of 14.4 nm. The fluorescence decay actions are investigated on a Jobin Yvon spectrometer. The radiative constants and peak emission cross-section values are obtained.

**Keywords:** Yb, Lu<sub>3</sub>Al<sub>5</sub>O<sub>12</sub>, ion irradiation, optical waveguide, photoluminescence spectroscopy.