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## Characterization of CdTe/CdMnTe quantum wells grown on Si(111)

Maria Vitoria T. Inocêncio<sup>1</sup>, Leonarde N Rodrigues<sup>1</sup>, **Sukarno Olavo Ferreira<sup>1</sup>**, and Fernando Iikawa<sup>2</sup>

<sup>1</sup>Department of Physics, Universidade Federal de Viçosa, Viçosa, Brazil

<sup>2</sup>Instituto de Física Gleb Wataghin, UNICAMP, Campinas, SP, Brazil

[sukarno@ufv.br](mailto:sukarno@ufv.br)

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### Abstract

The II-VI semiconductor compound CdMnTe have been studied for a long time due to its optoelectronic properties and application as solar cells, x-ray detectors and other devices. The great majority of these studies have used GaAs(001) as substrates since II-VI substrates with good quality are rare and very expensive. This work describes the characterization of CdTe/CdMnTe quantum wells grown directly on Silicon(111) substrate by molecular beam epitaxy. The growth parameters were adjusted to produce a 20 nm CdTe QW between 120 nm thick CdMnTe barriers, with 11% Mn content. High resolution x-ray diffraction, atomic force microscopy and micro-photoluminescence were used for sample characterization. Despite a lattice mismatch of almost 19% between the II-VI heterostructure and the Si substrate, the samples studied showed a remarkably intense photoluminescence signal. The PL spectrum is composed by a main peak, which can be assigned to QW confined state and low intensity shoulder near 1.47 eV, attributed to Cd vacancy defects. The main PL peak has a FWHM of about 0.02 eV but shows a fine structure composed by a series of very narrow lines with FWHM ten times smaller. The position and intensity of these lines change when the incident laser beam moves to different positions. These narrow lines are probably caused by 3D confined structures which can be formed during the QW growth, due to the sample surface roughness. This work has been supported by CAPES (88881.068506/2014-1), CNPq and FAPEMIG funding agencies.