

## **Electron paramagnetic resonance signals of manganese ions in cadmium telluride detected by a coherent Raman scattering**

**L. Glover, S. J. Bingham, J. J. Davies, and D. Wolverson**

*Department of Physics, University of Bath, Bath BA2 7AY, U.K.*

Electron paramagnetic resonance (EPR) signals of manganese ions in cadmium telluride have been detected optically by a coherent Raman scattering method. This technique circumvents the resolution limits of diffraction grating-based spectroscopy whilst providing the sensitivity and selectivity characteristic of resonant Raman scattering. As a consequence, the precision to which the spin Hamiltonian parameters of a given centre can be determined is greatly enhanced compared to conventional optical spectroscopy and, here, the effects of the hyperfine interaction between the  $\text{Mn}^{2+}$  3d electrons and the Mn nucleus on the lineshape of the spectrum become apparent. The Raman scattering process is found to be strongly resonant (with an intermediate state which is identified as a localised band edge exciton state) even for the paramagnetic resonance of the transition metal ion centre, due to the strong exchange coupling between band and Mn 3d states. This opens the way to optically site-selective EPR measurements of the symmetry, charge state and exchange interactions of transition metal ions in semiconductor materials relevant to the new and rapidly growing field of spintronics.