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Growth and characterization of room temperature antiferromagnetic I-Mn-V semiconductors[1] X. MARTI, Charles University in Prague, T. JUNGWIRTH, P. WADLEY, H. REICHLOVA, V. NOVAK, Institute of Physics ASCR, O. STELMAKHOVYCH, K. UHLIROVA, Charles University in Prague, P. BERAN, Nuclear Physics Institute ASCR, M. CUKR, Institute of Physics ASCR, F. MACA, Institute of Physics ASCR, Czech Republic, A.B. SHICK, Institute of Physics ASCR, J. MASEK, Institute of Physics ASCR, Czech Republic, P. HORODYSKÁ, P. NEMEC, V. HOLY, Charles University in Prague, J. ZEMEK, P. KUZEL, Institute of Physics ASCR, I. NEMEC, Charles University in Prague, B. GALLAGHER, R. CAMPION, C.T. FOXON, University of Nottingham, J. WUNDERLICH, Hitachi Cambridge Laboratory — The integration of ferromagnetism and semiconductors has been studied extensively, but devices operate well below room temperature. Recent theoretical and experimental works have opened a new route for spintronics based on antiferromagnets. Remarkably, high-temperature antiferromagnetic order is much more compatible with semiconductors than the ferromagnetic order. In our work we focus on the family of I-Mn-V antiferromagnetic semiconductor. We report on our synthesis of bulk and thin-film epilayers of the I-Mn-V compounds and on their basic electrical and magnetic properties. We will discuss the utility of these materials for designing antiferromagnetic semiconductor spintronic devices.

[1] Phys. Rev. B 83, 035321 (2010)
[2] http://arxiv.org/abs/1102.5373

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X. Marti
Charles University in Prague

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