115. Title: Classical ratchet effects in heterostructures with a lateral periodic potential

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Abstract: We study terahertz radiation induced ratchet currents in low dimensional semiconductor structures with a superimposed one-dimensional lateral periodic potential. The periodic potential is produced by etching a grating into the sample surface or depositing metal stripes periodically on the sample top. Microscopically, the photocurrent generation is based on the combined action of the lateral periodic potential, verified by transport measurements, and the in-plane modulated pumping caused by the lateral superlattice. We show that a substantial part of the total current is caused by the polarization-independent Seebeck ratchet effect. In addition, polarization-dependent photocurrents occur, which we interpret in terms of their underlying microscopical mechanisms. As a result, the class of ratchet systems needs to be extended by linear and circular ratchets, sensitive to linear and circular polarizations of the driving electromagnetic force.