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Rectification in Doped Mott Insulators Junctions¹ FLORIAN SABOU, JOHN MARSTON, Brown University — We discuss junctions made from doped Mott insulators [1] as a way to achieve rectification at high frequencies. To simulate such a junction we use a model of spinless electrons moving in one dimension, the t-V chain, and control the chemical potential on the two halves of the chain to create a p-n junction [2]. For short chains the many-body Schrodinger equation can be integrated numerically exactly, and we find that when subjected to an oscillating electromagnetic field such a device exhibits rectification with a preferred direction for charge transfer. Rectification is a function of both the frequency and the size of the oscillating electric field.

[1] J. Orenstein and A. Vishwanath, "Doped Mott Insulators. Breaking through to the other side," Nature Physics 6, 566 (2010).

[2] E. Manousakis, "Photovoltaic effect for narrow-gap Mott insulators," Phys. Rev. B82, 125109 (2010.

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