Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Anisotropic 2-dimensional Robin Hood model SERGEY BULDYREV, GABRIEL CWILICH, FREDY ZYPMAN, Department of Physics - Yeshiva University — We have considered the Robin Hood model introduced by Zaitsev[1] to discuss flux creep and depinning of interfaces in a two dimensional system. Although the model has been studied extensively analytically in 1-d [2], its scaling laws have been verified numerically only in that case. Recent work suggest that its properties might be important to understand surface friction[3], where its 2-dimensional properties are important. We show that in the 2-dimensional case scaling laws can be found provided one considers carefully the anisotropy of the model, and different ways of introducing that anisotropy lead to different exponents and scaling laws, in analogy with directed percolation, with which this model is closely related[4]. We show that breaking the rotational symmetry between the **x** and **y** axes does not change the scaling properties of the model, but the introduction of a preferential direction of accretion ("robbing" in the language of the model) leads to new scaling exponents. [1] S.I.Zaitsev, Physica **A189**, 411 (1992) [2] M. Pacuzki, S. Maslov and P.Bak, Phys Rev. **E53**, 414 (1996) [3] S. Buldyrev, J. Ferrante and F. Zypman Phys. Rev **E64**, 066110 (2006) [4] G. Odor, Rev. Mod. Phys. **76**, 663 (2004) .

Gabriel Cwilich
Department of Physics - Yeshiva University

Date submitted: 21 Nov 2008 Electronic form version 1.4