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Dissipative phases in the one-dimensional Kondo-Heisenberg model[1] ALEJANDRO LOBOS, Condensed Matter Theory Center, Department of Physics, University of Maryland, College Park, Maryland 20742, USA, MIGUEL A. CAZALILLA, Centro de Fisica de Materiales CSIC-UPV/EHU and Donostia International Physics Center, E-20018, San Sebastian, Spain, PIOTR CHUDZINSKI, DPMC-MaNEP, University of Geneva, 24 Quai Ernest-Ansermet CH-1211 Geneva, Switzerland — Atomic-sized magnetic structures built on clean metallic surfaces are currently under intense investigation [1]. Besides their potential uses in quantum information storage and processing, these systems allow to ask fundamental questions in condensed matter physics. In particular, the interplay between the Kondo effect (i.e., the screening of the atomic magnetic moment by conduction electrons) and Heisenberg exchange interactions between magnetic impurities has been recently investigated with scanning tunneling microscopy (STM) [2]. Inspired by the above developments, we study an one-dimensional chain of S=1/2 Kondo impurities coupled by anisotropic Heisenberg-Ising exchange and embedded in a two-dimensional metallic substrate. Remarkably, in the case of easy-plane exchange, we find a novel quantum phase exhibiting long-range order at zero temperature. We discuss implications of the existence of this phase for possible experiments. References: [1] R. Wiesendanger, RMP 81, 1495 (2009). [2] P. Wahl et al, PRL 98, 056601 (2007) and references therein.

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