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Franco Vivaldi* (f.vivaldi@qmul.ac.uk), School of Mathematical Sciences, Queen Mary, University of London, London, E1 4NS, England, and **John H Lowenstein** (john.lowenstein@nyu.edu), Department of Physics, New York University, 2 Washington Place, New York, NY 10003. *Interval-exchange transformations over algebraic number fields.*

We consider the restriction of interval-exchange maps to algebraic number fields, which leads to dynamics on lattices. We show that if the map is uniquely ergodic and renormalizable, then the scaling constant is a unit in a ring of algebraic integers associated with the scaling process. We study in detail a specific example, the cubic Arnoux-Yoccoz map, for which the inverse of the scaling unit has the Pisot property. We prove that each invariant lattice decomposes nontrivially into the union of finitely many orbits. The renormalization dynamics is described in terms of a generalized decimal expansion in a Pisot base, where the digits are algebraic integers. (Received August 10, 2007)