1125-VA-1065   **J B Coykendall** and **B G Goodell*** (`bggoode@clemson.edu`). *A Homological Approach to Factorization.*

An integral domain is said to be atomic if every element can be written as a product of irreducibles, but arbitrary integral domains cannot be assumed to be atomic. We study factorization in localizations of arbitrary (non-atomic) integral domains by using projections of groups of divisibility as a proxy by constructing a natural sequence of partially ordered groups. This sequence peels layers of atomicity away from arbitrary groups of divisibility like layers of an onion. In the direct limit, all that remains is the "antimatter" elements: a partially ordered group that has no minimal positive elements whatsoever and yet is generated by its positive elements. From this sequence, we can also obtain cochain complexes, we can compute their associated cohomology groups (whose properties detect factorization relationships in the underlying integeral domain), and we can prove structure theorems. These structure theorems correspond to a variation on the idea of universal factorization. (Received September 14, 2016)