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William Travis Trentham* (william.trentham@ndsu.edu), 3530 2nd Str North, Apt 19,
Fargo, ND 58102. *On the Integral Closure of an Antimatter Domain.*

We recall that an atomic domain is an integral domain in which each nonzero nonunit can be expressed as a (finite) product of irreducibles. Examples of such rings would include UFD's and Noetherian domains. Sometimes we lose this "nice" property. For example, any two dimensional valuation domain with a principal maximal ideal is not atomic. However, at least such a ring would admit an atom, i.e., an irreducible. If we favor domains in which the elements can be factored nicely into irreducibles, then we find the worst kind of behavior exhibited in those domains which admit no irreducibles whatsoever. Such a ring is called an Antimatter domain (AMD). A nice characterization of the antimatter property is that a domain D is an AMD if and only if its group of divisibility admits no minimal positive elements. With this observation it becomes relatively easy to find examples of valuation domains which exhibit the antimatter property. However, valuation domains are integrally closed. In this talk we will present an example of an antimatter domain whose integral closure may admit an irreducible and we will explore the question as to whether or not the integral closure of an AMD may be atomic or even Noetherian. (Received September 22, 2009)