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**Daniel Rogalski\*** (drogalsk@math.ucsd.edu) and **Jason Bell** (jpb@sfu.ca).  *$\mathbb{Z}$ -graded simple algebras.*

Let  $k$  be of a field of characteristic 0. The first Weyl algebra  $A_1(k) = k\langle x, y \rangle / (yx - xy - 1)$  is  $\mathbb{Z}$ -graded with  $\deg(x) = 1, \deg(y) = -1$ , and is a simple ring of GK-dimension 2. Sierra has studied its category of graded modules and shown how to find all  $\mathbb{Z}$ -graded algebras with an equivalent graded module category. Smith has also shown how the geometry of this example is related to a certain stack. Our goal is to study more general classes of  $\mathbb{Z}$ -graded simple rings to find more examples which may have interesting algebraic and geometric properties. Specifically, we study the structure of  $\mathbb{Z}$ -graded simple algebras  $A$  with graded quotient ring  $Q$  such that  $Q_0$  is a field with  $\text{trdeg}(Q_0) = \text{GK } A - 1$ . As a special case, we can classify all  $\mathbb{Z}$ -graded simple rings of GK-dimension 2. (Received August 29, 2011)