Samuel Gross and Joshua Harrington* (joshua.harrington@cedarcrest.edu), Cedar Crest College, 100 College Drive, Allentown, PA 18104. Special Numbers in the Ring $\mathbb{Z}_n$.

In a recent article, Andrzej Nowicki introduced the concept of a special number. Specifically, an integer $d$ is called special if for every integer $m$ there exist solutions in non-zero integers $a, b, c$ to the equation $a^2 + b^2 - dc^2 = m$. In this talk we investigate pairs of integers $(n, d)$, with $n \geq 2$, such that for every integer $m$ there exist units $a$, $b$, and $c$ in $\mathbb{Z}_n$ satisfying $m \equiv a^2 + b^2 - dc^2 \pmod{n}$. Upon refining a recent result of Harrington, Jones, and Lamarche on representing integers as the sum of two non-zero squares in $\mathbb{Z}_n$, a complete characterization of all such pairs is established. (Received September 19, 2015)