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Nicolas Allen Smoot* (mathdept@armstrong.edu), Armstrong Atlantic State University, 11935 Abercorn Street, Savannah, GA 31419. *The Structure of Consecutive Octic Residues*. Preliminary report.

One fascinating property of power residues modulo p , for some odd prime p , is that there are many beautiful patterns in their distribution among $\mathbb{Z}/p\mathbb{Z}$. The purpose of this talk is to discuss one of those patterns—specifically, the occurrence of consecutive pairs of power residues. The recent article titled “Enumeration of Triangles in Quartic Residue Graphs,” addressed the number of pairs of consecutive quartic residues modulo p , for an odd prime p , where the only nontrivial case is that in which $p \equiv 1 \pmod{4}$. We wish to extend the authors’ methods to derive a formula for the number of pairs of consecutive octic residues for a given prime p , where the only nontrivial case is that in which $p \equiv 1 \pmod{8}$. Since the formula for the number of pairs of consecutive quadratic residues is trivial to derive, and the more difficult quartic and octic equivalents are now known, we can then examine similarities in the structure of these formulas, and discuss the possibility of generalizing them to describe the number of consecutive 2^t residues modulo p . (Received August 01, 2012)