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Liem Nguyen* (lngu145@lsu.edu). *Weil Sum and Two Conjectures of Helleseth*. Preliminary report.

We consider the Weil sum of an additive character μ over a finite field K whose terms are power permutations on K , i.e for each $a \in K$, the Weil sum is defined to be $W_{K,s}(a) = \sum_{x \in K^*} \mu(x^s - ax)$ where s is an integer coprime to $|K^*|$. The value of these sums is of particular interest, as it links problems in coding and information theory to other areas of math such as number theory and arithmetic geometry. In 1976, Helleseth formulated two conjectures about the value of Weil sums which still remain unsolved. In this talk, we will discuss some recent progress made towards these two conjectures. (Received September 08, 2019)