1145-65-1101 **Yinlin Dong*** (ydong5@uca.edu), 201 Donaghey Avenue, Conway, AR 72035. *Weak Galerkin finite element method for Poisson's Equations.* Preliminary report.

We apply a new weak Galerkin (WG) finite element method with stabilization term to solve Poisson's equations. By introducing the discrete weak gradient, the WG method enables the trial and test functions to take separated values in the interior and on the boundary of each element. The method allows discontinuous piecewise polynomials with various degrees in the finite element space. Different combination of polynomial spaces leads to different formulations of WG, which makes the method highly flexible and efficient in practical computation. We will establish the optimal error estimates in both L^2 and H^1 norms. Numerical experiments will be presented for both structured and unstructured triangulations. (Received September 19, 2018)