1116-65-245 **Chunmei Wang*** (cwang462@math.gatech.edu), Skiles building, 686 Cherry St, NW, Atlanta, GA 30332. *A Locking-Free Weak Galerkin Finite Element Method for Elasticity Problems in the Primal Formulation.* Preliminary report.

We present an arbitrary order locking-free numerical scheme for linear elasticity on general polygonal/polyhedral partitions by using weak Galerkin (WG) finite element methods. Like other WG methods, the key idea for the linear elasticity is to introduce discrete weak strain and stress tensors which are defined and computed by solving inexpensive local problems on each element. Such local problems are derived from weak formulations of the corresponding differential operators through integration by parts. Locking-free error estimates of optimal order are derived in a discrete H^1-norm and the usual L^2-norm for the approximate displacement when the exact solution is smooth. Numerical results are presented to demonstrate the efficiency, accuracy, and the locking-free property of the weak Galerkin finite element method. (Received August 17, 2015)