1146-35-116 **Ahmet Ozkan Ozer*** (ozkan.ozer@wku.edu), 1906 College Heights Hill Blvd, Department of Mathematics, Western Kentucky University, Bowling Green, KY 42101. *A new formulation for the current or charge-controlled piezoelectric laminates and related stabilization results.*

We consider a piezoelectric laminate whose piezoelectric layers are actuated by current or charge; not voltage. The governing equations are derived through a consistent variational approach by the (linear) thin-compliant layer Rao-Nakra sandwich beam assumptions. For the inclusion of electromagnetic effects in piezoelectric layers, we consider all three approaches (electrostatic, quasi-static and fully dynamic) due to the potential formulation of Maxwell's equations. Essentially, two sets of initial value problems are derived for each actuation. State-space representations of models are shown to be well-posed with the choice of the Coulomb gauge condition. In fully-dynamic approaches, a dramatic reflection of magnetic effects on the stabilizability characteristics of the laminate with a B^* feedback is shown. The corresponding models provide alternate electromagnetic state feedback controllers. In electrostatic and quasi-static approaches, exponential stability (charge) and asymptotic stability (current) results are proved. Finally, the stabilization results for each approach and actuation are simulated through filtered finite differences and compared side by side. If time left, open problems and ongoing research will be discussed. (Received January 13, 2019)