1144-53-13 **Paul Laurain** and **Longzhi Lin*** (lzlin@ucsc.edu). *Energy convexity of intrinsic bi-harmonic map and its heat flow I: spherical target.*

Every harmonic map is an intrinsic bi-harmonic map as an absolute minimizer of the intrinsic bi-energy, therefore intrinsic bi-harmonic map and its heat flow are more geometrically natural to study, but they are also considerably more difficult analytically than the extrinsic counterparts due to the lack of coercivity for the intrinsic bi-energy. In this talk, we will discuss an energy convexity and thus uniqueness for weakly intrinsic bi-harmonic maps from the unit 4-ball $B_1 \subset \mathbf{R}^4$ into the sphere $\mathbf{S}^n$. This is a higher-order analogue of the energy convexity and uniqueness for weakly harmonic maps on unit 2-disk in $\mathbf{R}^2$ proved by Colding and Minicozzi in 2008. In particular, this yields a version of uniqueness of weakly harmonic maps on the unit 4-ball, which is new. We will also discuss a version of energy convexity along the intrinsic bi-harmonic map heat flow into $\mathbf{S}^n$, which in particular yields the long-time existence of the intrinsic bi-harmonic map heat flow, a result that was until now only known assuming the non-positivity of the target manifolds by Lamm in 2005. Moreover, the energy convexity along the flow yields the uniform convergence of the flow, which is not known before. This is joint work with Paul Laurain. (Received June 04, 2018)