Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

A technique for studying cardiac myosin dynamics using optical tweezers[1] MICHAEL PAOLINO, SAM MIGIRDITCH, Appalachian State Univ, YURI NESMELOV, University of North Carolina Charlotte, BROOKE HESTER, Appalachian State Univ, APPALACHIAN STATE BIOPHYSICS AND OPTICAL SCIENCES FACILITY TEAM — A primary protein involved in human muscle contraction is myosin, which exists in α- and β- isoforms. Myosin exerts forces on actin filaments when ATP is present, driving muscle contraction. A significant decrease in the population of cardiac α-myosin has been linked to heart failure. It is proposed that slow β-myosin in a failing heart could, through introduction of a drug, be made to mimic the action of α-myosin, thereby improving cardiac muscle performance. In working towards testing this hypothesis, the focus of this work is to develop a technique to measure forces exerted by myosin on actin using optical tweezers. An actin-myosin arrangement is constructed between two optically trapped polystyrene microspheres. The displacement of a microsphere is monitored when ATP is introduced, and the force responsible is measured. With this achieved, we can then modify the actin-myosin arrangement, for example with varying amounts of α- and β- myosin and test the effects on forces exerted. In this work, assemblies of actin and myosin molecules and preliminary force measurements are discussed.

[1]North Carolina Space Grant

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Date submitted: 16 Nov 2016 Electronic form version 1.4