Synthesis and thermoelectric property of Ca-doped n-type Bi$_{85}$Sb$_{15}$ alloy KAMAL KADEL, WENZHI LI, Florida International University, GIRI JOSHI, GMZ, ZHIFENG REN, Boston College — Bi$_{1-x}$Sb$_x$ (0.09<x<0.20) alloys are n-type semiconducting materials that exhibit a good thermoelectric property at low temperature, around 80 K. In the present work we investigated the thermoelectric properties of undoped Bi$_{85}$Sb$_{15}$ and different Ca-doped Bi$_{85}$Sb$_{15}$Ca$_x$ alloys (x=0.5, 2, and 5) synthesized via arc-melting first and followed by ball milling and hot pressing. Effect of different Ca doping levels on transport properties of Bi$_{85}$Sb$_{15}$ alloys has been investigated. It is found that thermal conductivity decreases with increasing Ca. Electrical transport measurements show that power factor increases with doping level of Ca up to Bi$_{85}$Sb$_{15}$Ca$_2$ and then decreases, yielding the maximum value of power factor of $3.8 \times 10^{-3}$ Wm$^{-1}$K$^{-2}$ and ZT of 0.39 at room temperature for Bi$_{85}$Sb$_{15}$Ca$_2$. Properties at below room temperature will also be presented.