Contribution ID: **101**                                                      Type: **Oral**

# Emission of Photons and Relativistic Axions from Axion Stars

*Thursday 10 August 2017 17:15 (15 minutes)*

The number of nonrelativistic axions can be changed by inelastic reactions
that produce relativistic axions or photons.
Any even number of nonrelativistic axions can scatter inelastically into two relativistic axions. Any odd number of axions can annihilate into two photons.
This reaction produces a monochromatic radio-frequency signal at an odd-integer harmonic of the fundamental frequency set by the axion mass. The loss rates of axions from axion stars through these inelastic relations are calculated using the framework of a nonrelativistic effective field theory. Odd-integer harmonics of a fundamental radio-frequency signal provide a unique signature for collapsing axion stars or any dense configuration of axions.

**Authors:**   BRAATEN, Eric (Ohio State University);  MOHAPATRA, Abhishek (The Ohio State University);  ZHANG, Hong

**Presenter:**   MOHAPATRA, Abhishek (The Ohio State University)

**Session Classification:**  Dark matter

**Track Classification:**  Dark matter (direct detection, indirect detection, theory, etc.)