

## Proposed FY18 Research Topic

1. **Research Title:** High Performance LWIR Detector Arrays Based on III-V Antimonide Strained Layer Superlattices
  
2. **Individual Sponsor:**  
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3. **Academic Area/Field and Education Level:** Electrical Engineering, Electro-optics, Physics, Materials Science (MS or Ph.D. level)
  
4. **Objectives:** The objective of this effort is to investigate approaches that improve the performance of infrared focal plane arrays (FPAs) operating in the longwave infrared (LWIR) 8-12  $\mu\text{m}$  band. Specifically, we are interested in LWIR detector arrays that are constructed using III-V elements, i.e. antimonide based strained layer superlattices (SLS).
  
5. **Description:** There has been significant progress recently on the development of III-V LWIR FPAs based on SLSs, but performance improvements have lagged behind that of midwave infrared (MWIR) designs. There are a variety of reasons for this, but the end result is that LWIR SLS FPAs are not yet competitive with state of the art LWIR HgCdTe. In this project, current designs will be investigated to determine the performance limiting mechanisms, and new designs will be developed, fabricated, and demonstrated in array formats up to 1K x 1K. In addition to device design, improvements in material growth and device fabrication may be investigated as a way to produce devices with improved performance. Novel concepts will be explored, but solutions should be amenable to commercial-scale FPA manufacturing.
  
6. **Research Classification/Restrictions:** This research is unclassified.
  
7. **Eligible Research Institutions:** Indicate to what organizations this topic should be provided
  - DAGSI**
  - AFIT (only)**
  - USAFA (only)**

If you are submitting a topic for the USAFA, indicate if you are also interested in sponsoring a USAF Cadet in summer 2015 (Average cost for USAF Cadet for 33 days is \$5000)

Yes                       No