

1. **Research Title:** Semiconductor Laser Source Phenomenology and Development
2. **Individual Sponsor**
 - Dr. Robert G. Bedford, AFRL/RYPDH
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3. **Academic Area/Field and Education Level:** Electrical Engineering / Physics (MS or Ph.D. level)
4. **Objectives:** *Employ functional and novel semiconductor lasers and materials for SWIR and MWIR sensors applications*
5. **Description:** *Applications in active sensors and infrared countermeasures may often be significantly improved by employing novel semiconductor sources which employ new materials or approaches to understanding semiconductor phenomenology. We theoretically and experimentally investigate high-brightness semiconductor lasers with unique properties such as broad tunability and spectral access. Interest areas include material design and development, fabrication, coupled resonator designs, passive mode-locked lasers, spatial temporal waveform generation schemes for semiconductor lasers, as well as nonlinear optical components. Fabrication facilities are available including semiconductor growth, typical microfabrication techniques, electron-beam lithography, as well as numerous metal and dielectric film deposition techniques. A full testing capability suite is available for cryogenic through high-temperature measurements for device operation.*
6. **Research Classification/Restrictions:** *Permanent residents only – unclassified.*
7. **Eligible Research Institutions:** Indicate to what organizations this topic should be provided.
 - DAGSI (Wright State University, AFIT, Ohio State University, University of Dayton, Miami University, Ohio University, University of Cincinnati)
PA Approval #: **Topics submitted to DAGSI must be approved for public release.**
 - AFIT (only)
 - USAFA (only)
If you are submitting a topic for the USAFA, please indicate if you are also interested in sponsoring a USAF Cadet in summer of 2013 (**Avg Cost for USAF Cadet for 33 days was \$5000**)
 - Yes No