

AFRL RESEARCH TOPIC CALL FOR FY14

ATTACHMENT 1

1. **Research Title:** "Mid-IR Solid-State Laser Development"
2. **Individual Sponsor:**
 Dr. Patrick A. Berry, AFRL/RYPDH
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3. **Academic Area/Field and Education Level:** Electro-Optics, Optical Engineering or Engineering Physics (MS or Ph.D. level)
4. **Objectives:** The main thrust of this research is development and maturation of innovative solid-state lasers and devices operating in the 2-5 μm wavelength region and possessing a wide range of operational attributes. Infrared countermeasures (IRCM), laser radar, remote sensing and communications are just a few of the drivers of high-power solid-state mid-IR laser development. The nature of these applications shapes the laser operational requirements such as output power, tunability, beam quality and room temperature operation. Lasers are required which operate with pulse formats from continuous-wave (CW) to sub-picosecond and do so over a quickly tunable range of wavelengths.
5. **Description:** Laser development for this project is aimed at producing high power sources with the ability to operate in a variety of temporal modes including continuous wave (CW), long pulse (ms), short pulse (ns) and ultrashort pulse (ps, fs) regimes. Tunability of wavelength output is critical to applications adaptability and allows sources in these wavelengths to also act as pumps for non-linear conversion devices. The main focus of this research is transition-metal-doped II-VI materials such as divalent chromium- and iron-doped zinc selenide (Cr:ZnSe / Fe:ZnSe). Research would investigate high-power CW, short pulse and ultrashort pulse operation, waveguide and optical fiber geometries and development of pump sources and ancillary devices required for system development such as switches, modulators, isolators and tuning elements.
6. **Research Classification/Restrictions:** The research performed on this project is anticipated to be fundamental in nature, with no inherent publication or presentation restrictions. There may be aspects of requirements analysis or comparison to state-of-the-art devices and components that are deemed FOUO and have public release or ITAR restrictions.
7. **Eligible Research Institutions:** Place an X in all that apply.

<input checked="" type="checkbox"/> Universities (DAGSI)	<input checked="" type="checkbox"/> AFIT (only)	<input checked="" type="checkbox"/> USAFA
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8. **Interest in Summer USAFA Cadet (Avg Cost for USAF Cadet for 33 days was \$5000):**
 If we have the funds, yes.