Opportunity Title: Remote off-axis detection of laser radiation
Opportunity Reference Code: IC-16-07

Organization Office of the Director of National Intelligence (ODNI)

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Complete your application – Enter the rest of the information required for the IC Postdoc Program Research Opportunity. The application itself contains detailed instructions for each one of these components: availability, citizenship, transcripts, dissertation abstract, publication and presentation plan, and information about your Research Advisor co-applicant.

Application Deadline 4/15/2016 6:00:00 PM Eastern Time Zone

Description The goal of this proposal is to develop novel methods for the remote detection of laser radiation in the atmosphere.

While most methods for detecting and characterizing laser beams rely on either direct interaction between the laser beam with the detector or direct observation of laser reflection from a target, this is not feasible in many cases of interest due to the lack of direct interaction between the light and the sensor used for detection. However, the laser radiation also interacts with the atmosphere, and the results of this class of interactions is sometimes detectable remotely. Many such methods are absent or inadequately researched in the physics and engineering literature and could potentially be developed into effective methods of remote laser detection.

Example Approaches

Laser beam interaction with the atmosphere results in numerous phenomenologies that may be detectable remotely. These include but are not limited to linear scattering, nonlinear optical phenomena, classical or quantum coherence effects, photoacoustic effects, and ponderomotive forces. These and other methods may be used for the remote indirect detection of light.

Successful projects could study and experimentally evaluate interactions between the laser and the atmosphere in the laboratory environment with the goal of remotely characterizing laser radiation at distances of at least several meters. Experiments that are scalable to kilometers in the outdoor environment are strongly encouraged. Proposals that propose novel or unique laser/atmosphere interactions that may be applied to the remote detection of laser beams are also of special interest. There is strong interest in the near-IR through mid-IR wavelength ranges at any level of irradiance from milliwatts through kilowatts per square centimeter, but proof-of-concept experiments at visible wavelengths or other power levels are also useful.

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Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Doctoral Degree.
- **Discipline(s):**
  - **Business** (11)
  - **Chemistry and Materials Sciences** (12)
  - **Communications and Graphics Design** (6)
  - **Computer, Information, and Data Sciences** (16)
  - **Earth and Geosciences** (21)
  - **Engineering** (27)
  - **Environmental and Marine Sciences** (14)
  - **Life Health and Medical Sciences** (45)
  - **Mathematics and Statistics** (10)
  - **Other Non-Science & Engineering** (13)
  - **Physics** (16)
  - **Science & Engineering-related** (1)
  - **Social and Behavioral Sciences** (28)