

**Opportunity Title:** Wideband Electromagnetic Field Measurement with a Low Cost, Size, Weight and Power Quantum Sensing Solution

**Opportunity Reference Code:** ICPD-2025-15

**Organization** Office of the Director of National Intelligence (ODNI)

**Reference Code** ICPD-2025-15

**How to Apply** **Create and release your Profile on Zintellect** – Postdoctoral applicants must create an account and complete a profile in the on-line application system. **Please note: your resume/CV may not exceed 3 pages.**

**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.

Additional information about the IC Postdoctoral Research Fellowship Program is available on the program website located at: <https://orise.orau.gov/icpostdoc/index.html>.

If you have questions, send an email to [ICPostdoc@orau.org](mailto:ICPostdoc@orau.org). Please include the reference code for this opportunity in your email.

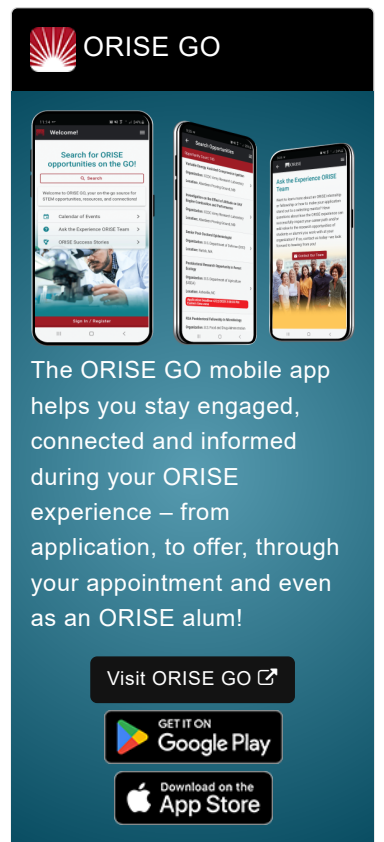
**Application Deadline** 2/28/2025 6:00:00 PM Eastern Time Zone

**Description** **Research Topic Description, including Problem Statement:**

Quantum sensing development has provided novel methods to capture various electrical parameters with a wide array of sensing solutions including the Electrical/Magnetic/Electromagnetic field measurement however for its limited research and design, the EM field measurement is still at the nascent stage. This is further exacerbated with the absence of low cost, size, weight and power developmental solution. However, with the progress in Quantum sensing for its various technological solutions based on entangling, interference mechanism, Rydberg atoms and Nitrogen Vacancy detector have provided a hope for the sensitive, precise and low-level signal strength EM measurement at single frequency or limited bandwidth. The additional research gaps arise due to the sensing mechanism protocols for continuous, pulsed or mixed dynamical coupling and the absence of non-classical mechanism of processing at quantum level. The quantum sensing development would provide a low cost, power and portable mechanism for the metallic/non-metallic detection within a high precise EM field and weak signal strength in a noisy environment while bringing new vitality in the EM field sensing approach.


**Example Approaches:**


- Computational modelling and architectural design.
- Optimize the design for the physical construction.
- Experimental demonstration of the wideband EM field measurement.
- Real time measurement and response accuracy enhancement within a dynamic EM environment.
- Development of lightweight, low power design for its integration within a physical space.




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## References

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- Hill et al., 2023, "Wideband Simultaneous Microwave Demodulation with a Rydberg Quantum Sensor", in Optica Quantum 2.0 Conference and Exhibition, Technical Digest Series, paper QTu4B.4.  
<https://opg.optica.org/abstract.cfm?URI=QUANTUM-2023-QTu4B.4>

**Key Words:** Quantum, Electromagnetic, Electric, Magnetic, RF, Wideband.

## Qualifications **Postdoc Eligibility**

- U.S. citizens only
- Ph.D. in a relevant field must be completed before beginning the appointment and within five years of the appointment start date
- Proposal must be associated with an accredited U.S. university, college, or U.S. government laboratory
- Eligible candidates may only receive one award from the IC Postdoctoral Research Fellowship Program

## **Research Advisor Eligibility**

- Must be an employee of an accredited U.S. university, college or U.S. government laboratory
- Are not required to be U.S. citizens

## **Point of Contact** [Keri Tarwater](#)

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|---------------------|--|
| <b>Eligibility</b>  | <ul style="list-style-type: none"><li>• <b>Citizenship:</b> U.S. Citizen Only</li></ul>  |
| <b>Requirements</b> | <ul style="list-style-type: none"><li>• <b>Degree:</b> Doctoral Degree.</li><li>• <b>Discipline(s):</b><ul style="list-style-type: none"><li>◦ <b>Chemistry and Materials Sciences</b> (<a href="#">12</a>)</li><li>◦ <b>Communications and Graphics Design</b> (<a href="#">3</a>)</li><li>◦ <b>Computer, Information, and Data Sciences</b> (<a href="#">17</a>)</li><li>◦ <b>Earth and Geosciences</b> (<a href="#">21</a>)</li><li>◦ <b>Engineering</b> (<a href="#">27</a>)</li><li>◦ <b>Environmental and Marine Sciences</b> (<a href="#">14</a>)</li><li>◦ <b>Life Health and Medical Sciences</b> (<a href="#">45</a>)</li><li>◦ <b>Mathematics and Statistics</b> (<a href="#">11</a>)</li><li>◦ <b>Other Non-Science &amp; Engineering</b> (<a href="#">2</a>)</li><li>◦ <b>Physics</b> (<a href="#">16</a>)</li><li>◦ <b>Science &amp; Engineering-related</b> (<a href="#">1</a>)</li></ul></li></ul> |

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- **Social and Behavioral Sciences** ([30](#) )