CLION

Center for Large-Scale Integrated Optimization & Networks

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MEMPHIS

Advanced Radar Imaging and Sensor Integration Laboratory(ARSIL)

The Advanced Radar Imaging and Sensor Integration Laboratory (ARSIL)

ARSIL is a newly established facility part of the University on Memphis' Center for Large-Scale Integrated Optimization and Networks (CLION) located at the FedEx Institute of Technology (FIT) on the third floor rooms 314 and 316.

# The Advanced Radar Imaging and Sensor Integration Laboratory (ARSIL)

It was made possible by a partnership between the Air Force Research Laboratory (AFRL), Sensors Directorate, Dayton OH and the University of Memphis. Under this agreement CLION received over $500k of radar equipment to establish the ARSIL.

ARSIL - Charter

The Advanced Radar Imaging and Sensor Integration Laboratory supports CLION research aimed at developing pervasive sensor systems capable of monitoring movement of humans and vehicles in challenging recognition situations with high noise and clutter.
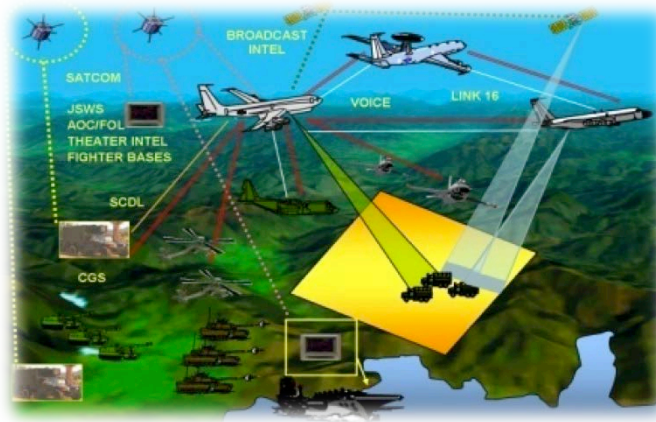
ARSIL - Charter

The facility is an anechoic RCS and Radar imaging testbed for device and algorithm development. As a teaching tool it provides practical hands-on experience to students.
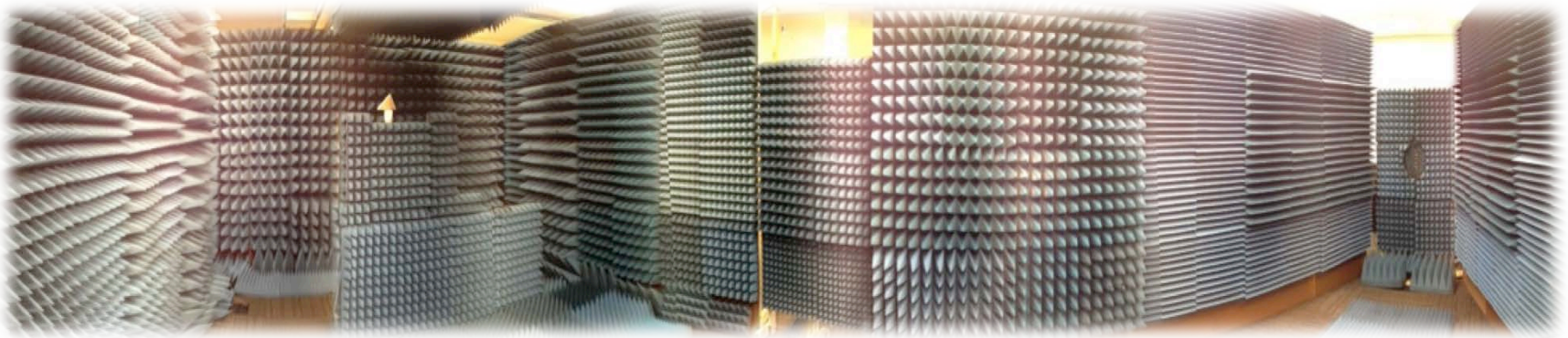
ARSIL – Functional Uses

Advanced radar imaging anechoic testbed

- Radar imaging of targets of interest to determine scattering characteristics.

- Investigate radar penetration through lossy materials e.g. walls, foliage or crates.
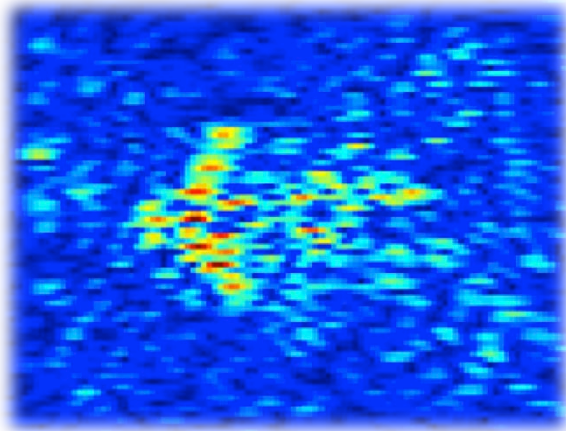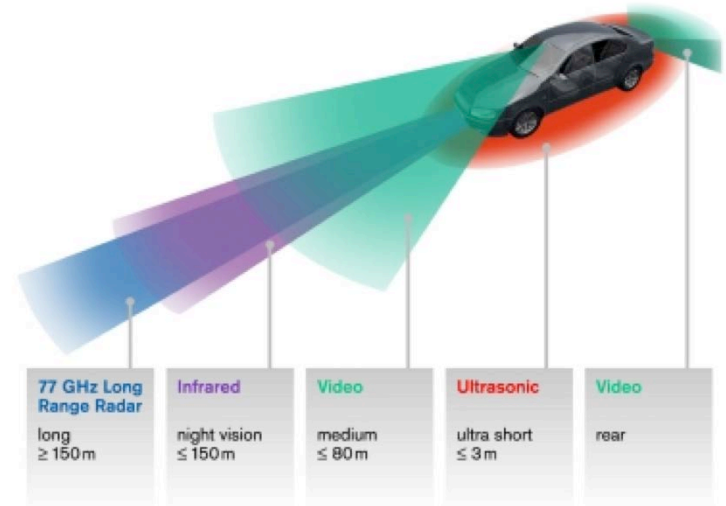
Algorithm and signal processing development

- Verification of classification algorithms.

- Test SAR and ISAR algorithms.

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ARSIL – Functional Uses

Sensor fusion and integration testing: Anechoic environment to test sensor suites that may include several modalities e.g. vibration or light

| 77 GHz Long Range Radar	Infrared	Video	Ultrasonic	Video
long ≥ 150 m	night vision ≤ 150 m	medium ≤ 80 m	ultra short ≤ 3 m	rear

Device testing and development

Anechoic environment to test performance of sensors such as the pocket radar or other radar sensors

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ARSIL – Resources

- Chamber
- Equipment
- Additional Miscellaneous

ARSIL - Reconfigurable Anechoic Chamber
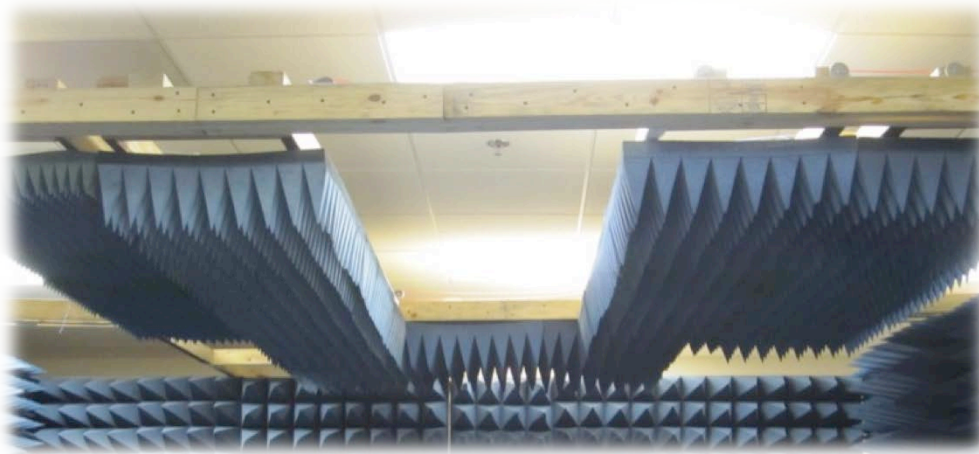
- 15ft. x 36ft and ceiling height of 9ft.
- 21 4ft. x 9ft. moveable absorber panels.
- Movable support beams and absorber frames for ceiling coverage.
- Reconfigurable configuration allows simulation of un-cluttered, semi-cluttered, and cluttered environments.
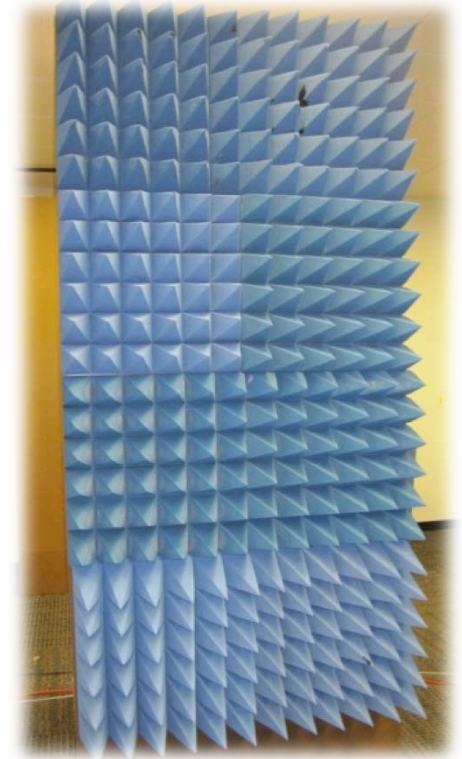
ARSIL – Imaging equipment

HP equipment

- **HP 8510B:** Network Analyzer.

- **HP 8511A**: Frequency converter 45MHz – 26.5GHz Frequency Converter.

- **HP 8515A:** 45MHz–26.5GHz S-Parameter Test Set.

- **HP 8341B:** 10MHz–20GHz Synthesized Sweeper.

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ARSIL – Imaging equipment

Positioners

- Scientific Atlanta azimuth/elevation positioner.

- Daedal/Parker linear stages X,Y,Z.

ARSIL – Additional Resources

- Traveling wave tube amplifiers.

- 0.4MHz – 160 MHz Synthesizers.

- Agilent 8530A : Microwave Receiver

- Agilent 85309A H21: 100MHz – 18 GHz LO/IF Distribution Unit

- Agilent 85651B: 10MHz – 50GHz (8360B Series) Synthesized Sweeper

- Agilent E4991: 1MHz – 3GHz RF material/ impedance analyzer

- Daedal/Parker 4 axis servo stepper controller and Zeta Drivers.

- Daedal 4 axis controller Model MC3000.

ARSIL – Additional Resources

- Standard gain horns; X-band (8.2-12.4Ghz), Ku-band (12.4-18Ghz).
- Reference targets; various spheres, corner reflectors.
- Targets; model planes.
- Microwave switch.
- Logic analyzer.
- Material analyzer.
- Spectrum analyzers.
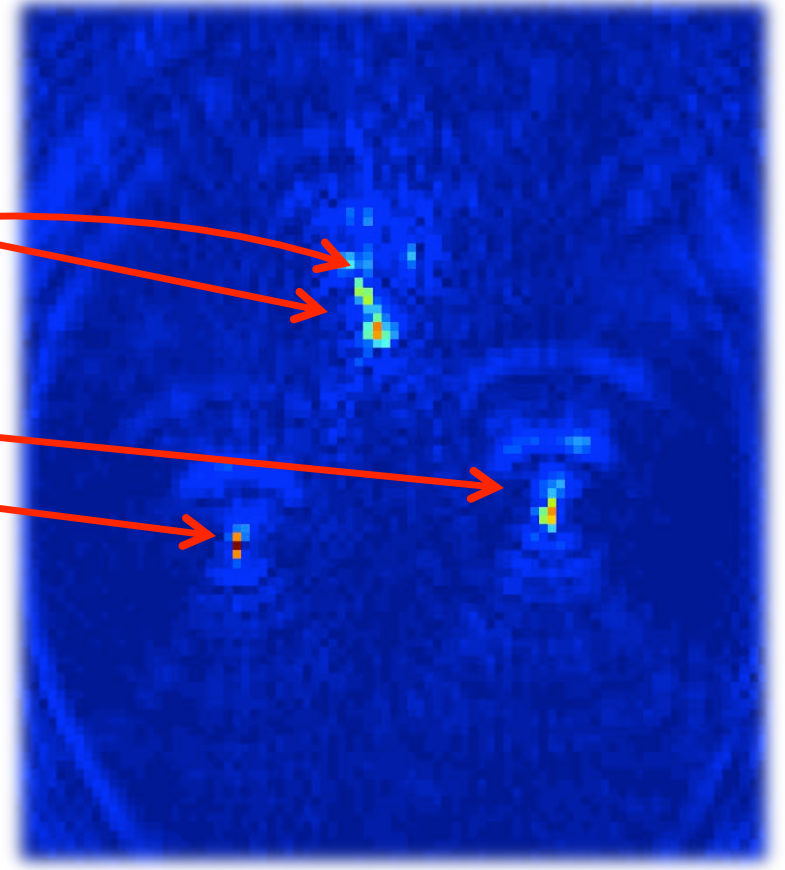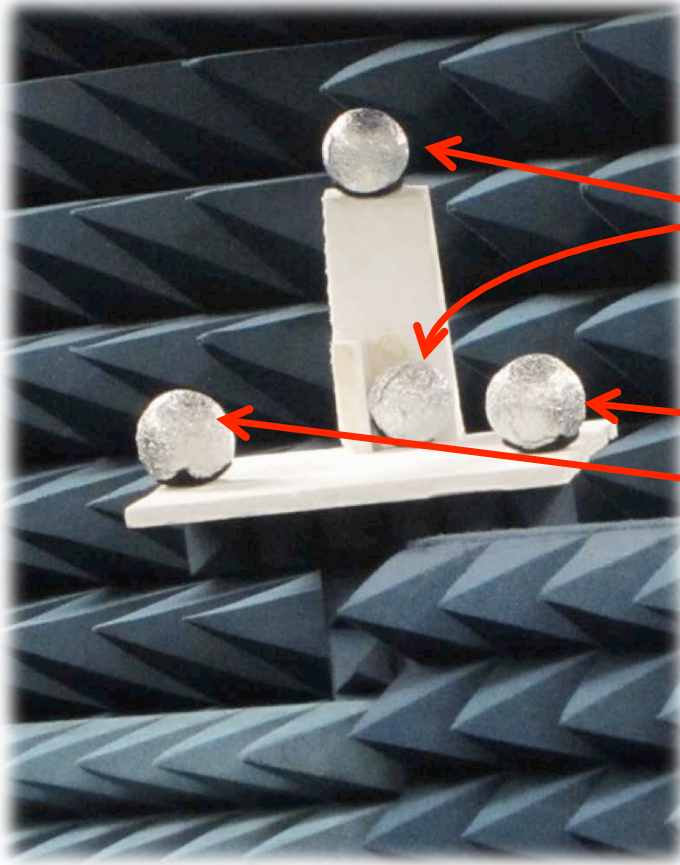- Oscilloscopes.
- Traveling wave tube amplifiers.

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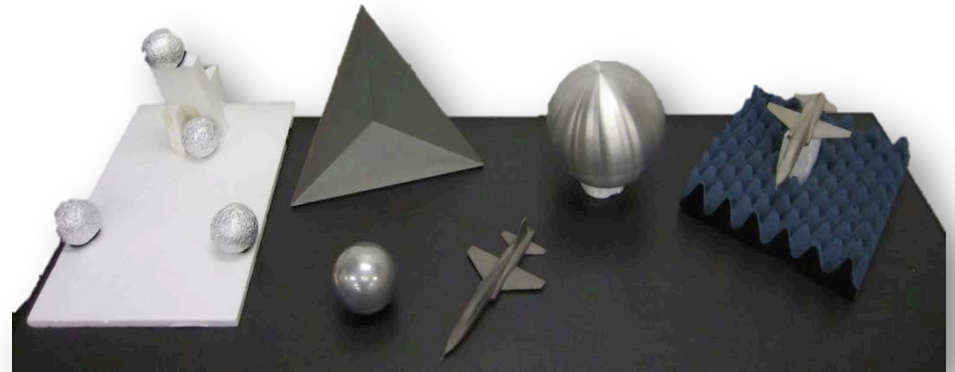
ARSIL – Measurements and Images

Initial Measurements and Images from the Imaging system
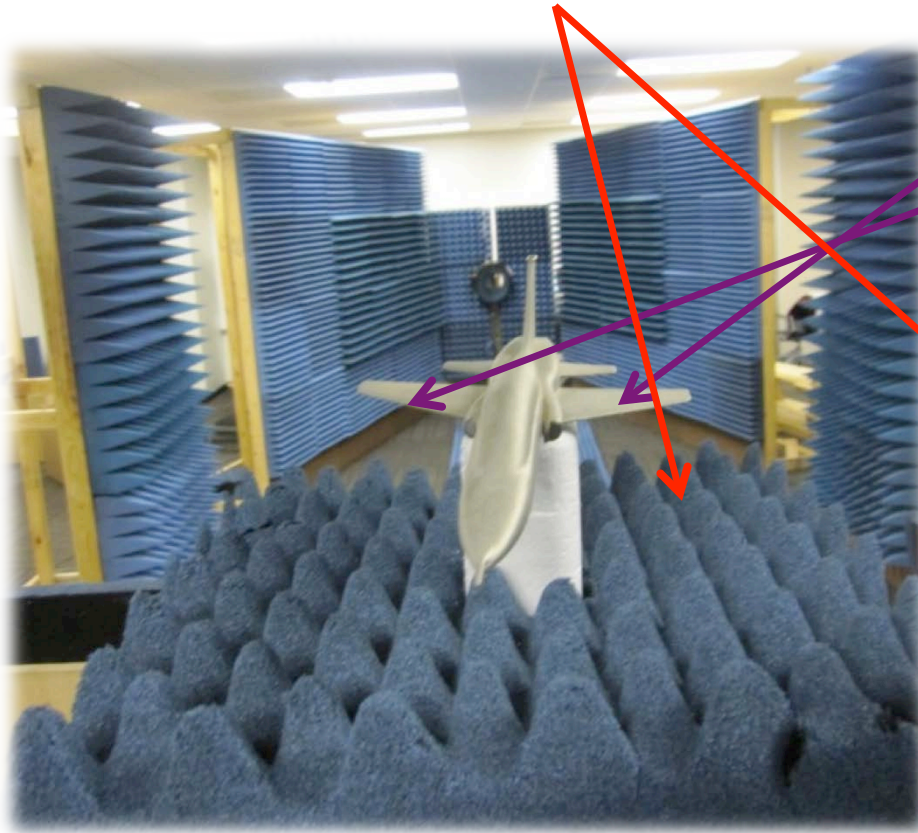
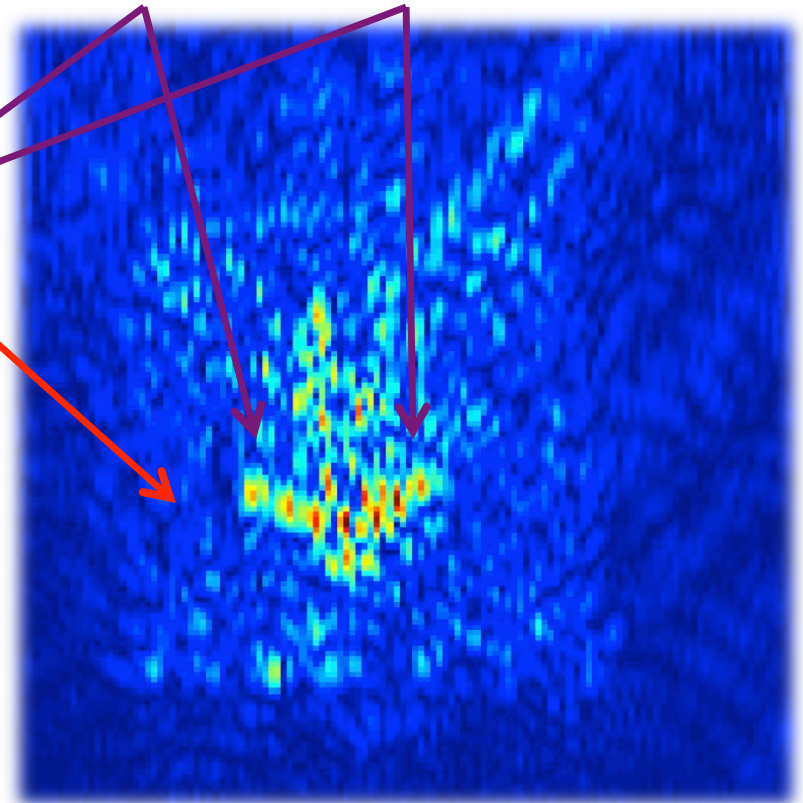# Initial Images – Simple Four Sphere Target
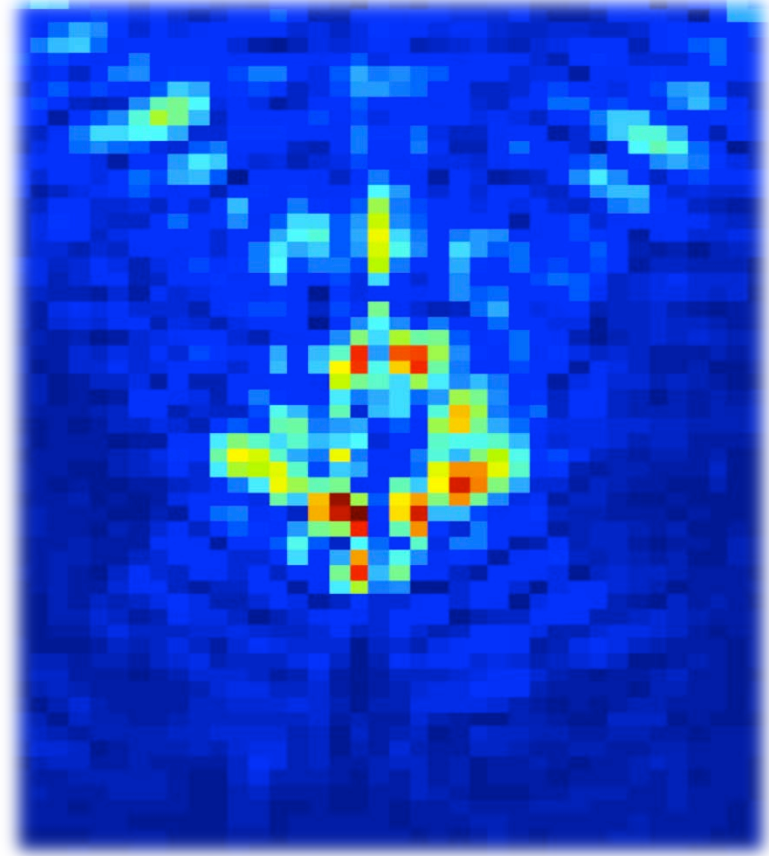
Initial Images – Model Plane With Absorber

Absorber Plane

Scatter from Wings

Initial Images – Model Plane No Absorber

Contact Information

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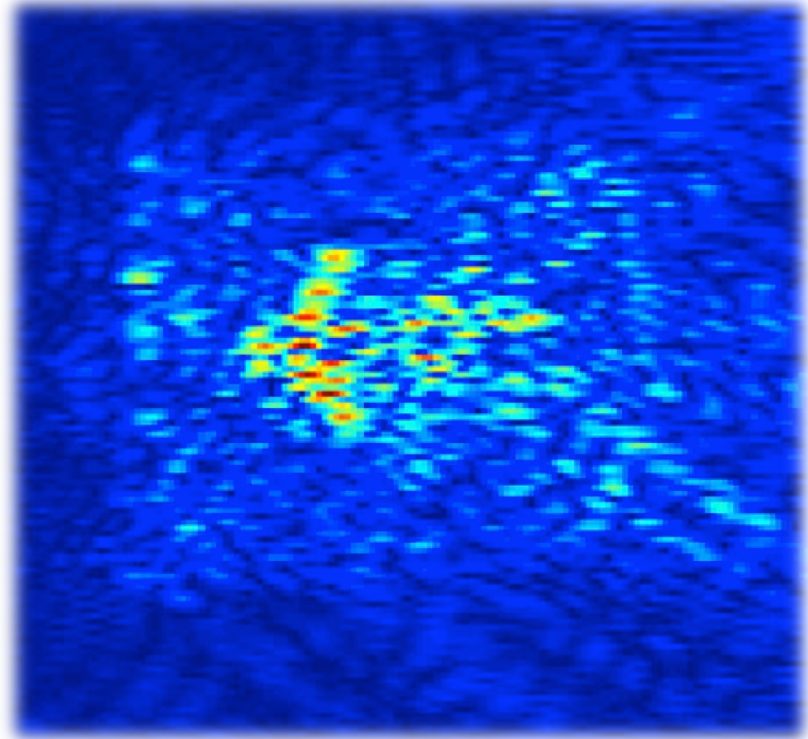
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