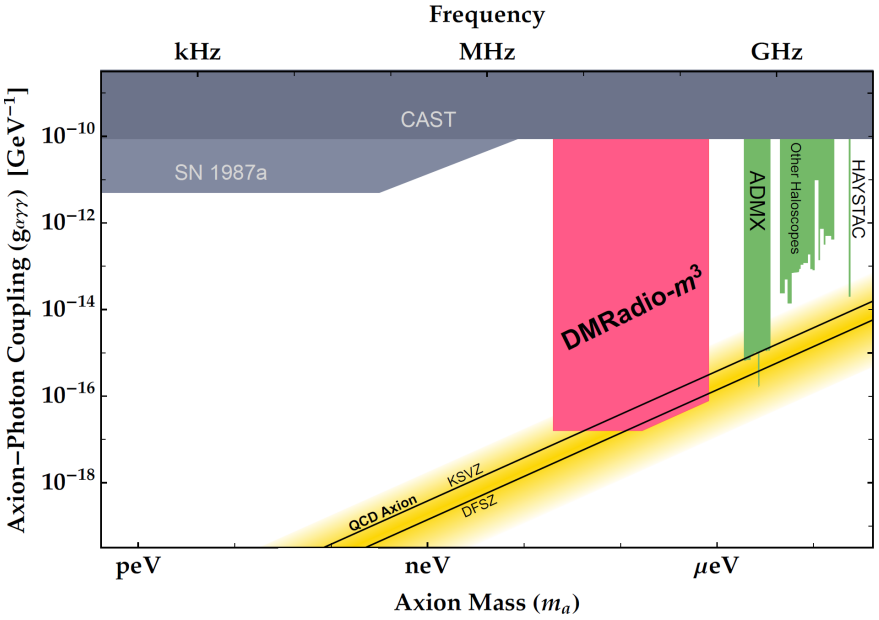
DMRadio-m³ science reach



The Dark Matter Radio Cubic Meter First Consortium Meeting

Jan. 23, 2020

DM Radio Experiment Family

DM Radio-50L

- ~0.5 T, 50 L magnet
- Dilution refrigerator
- ALP science
- Platform for quantum

Dark Matter Radio Cubic Meter (DMRadio-m^3)

Engineering design funded under DOE Dark Matter New Initiatives call

- Brings together both DM Radio and ABRACADABRA teams
- QCD axion over 5 MHz – 200 MHz (20neV-0.8 μeV)
- ~4T, ~m^3 magnet
- Dilution refrigerator
- Optimal high-Q resonant experiment
- DC SQUID, 20x the quantum limit

The Consortium is ONLY DMRadio-m^3!

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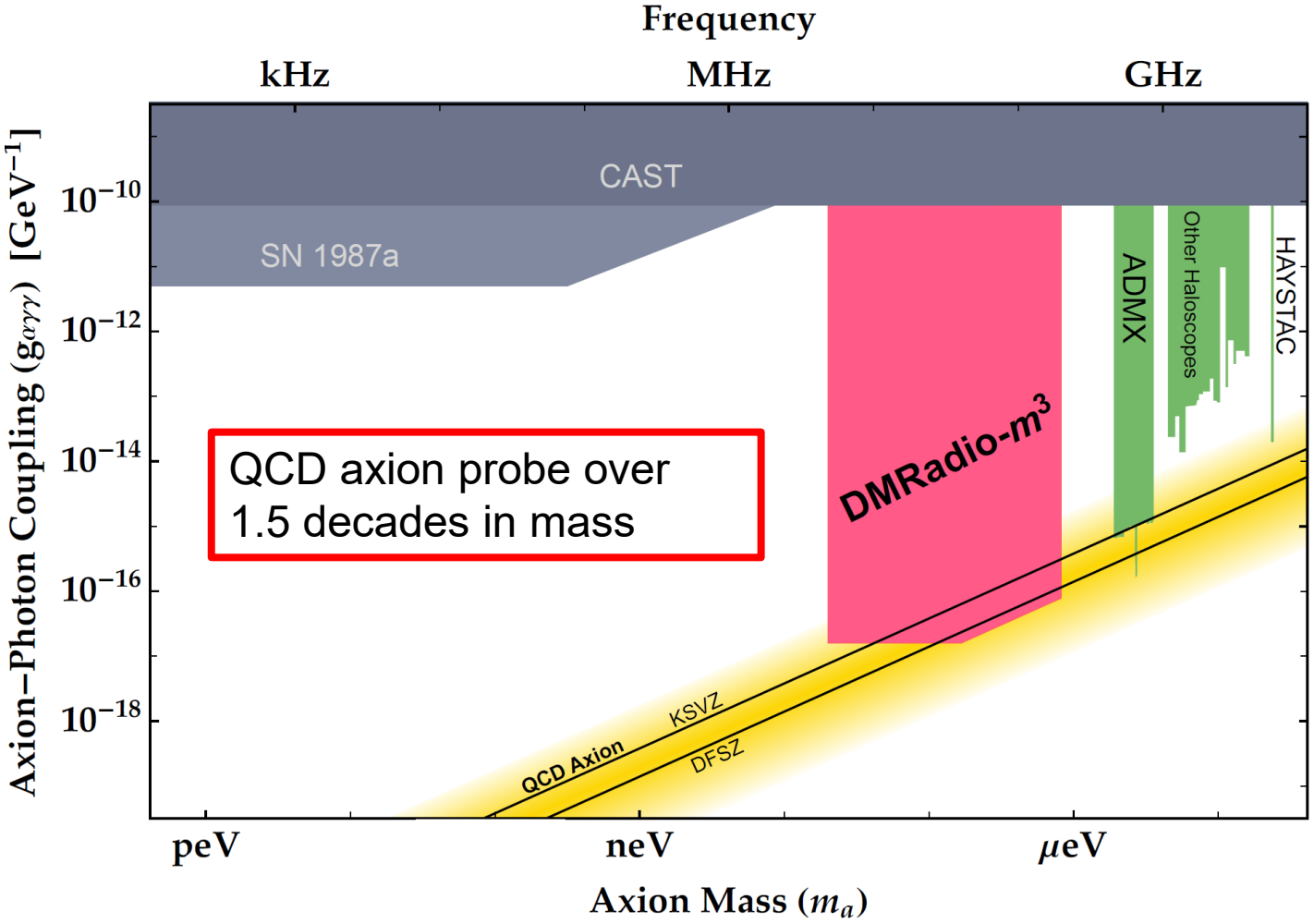
DM Radio Cubic Meter Consortium

Engineering design funded under

DOE New Initiatives in Dark Matter program

Name	Institution	Role / Team Lead
Kent Irwin	SLAC and Stanford	Consortium PI
Karl van Bibber	UC Berkeley	Magnet
Lindley Winslow	MIT	Magnetic shielding, vibration
Saptarshi Chaudhuri	Princeton	Control system, scan
Peter Graham	Stanford	Theory
Reyco Henning	UNC Chapel Hill	Calibration and DAQ
Dale Li	SLAC	Cryomechanical
Hsiao-Mei Cho	SLAC	SQUID
Wes Craddock	SLAC	Engineering
Nadine Kurita	SLAC	Project Management

DMRadio-m^3 Science Reach



- ~4T, ~m^3 magnet
- Dilution refrigerator
- DC SQUID, 20x the quantum limit

- 5 MHz – 200 MHz
- (20 neV – 0.8 μeV)
- 5 year scan (3 years live)

Main goals for today

Get to know each other, and our roles and plans.

Remind ourselves of the goals of the Consortium.

Main technical goal for the afternoon:

- By the end of today, everyone should understand our process to establish initial dimensions for a “3 months” magnet / cryomechanical design.
- By the end of today, formally agree on a deadline (perhaps one or two weeks) to choose these initial dimensions.

DM Radio-M3 Consortium Meeting

Thursday 23 Jan 2020, 08:00 → 21:00 America/Los_Angeles

Varian Physics Meeting Room (Stanford)

08:00 → 09:00 **Consortium Welcome** — Varian 370

- **08:00** **Doughnuts and Coffee** — 30m
- **08:30** **Welcome and Introductions** — 15m
  Speaker: Prof. Kent Irwin (SLAC/Stanford)
- **08:45** **Project Database and Review of Proposal Document** — 15m
  Walkthrough of the DM Radio online database. Overview of the general project milestones and deliverables.
  Speaker: Dr Dale Li (SLAC)

09:00 → 11:00 **Team Backgrounds and General Plans** — Varian Physics Meeting Room

Each Consortium Team Lead will announce their team and introduce their relevant experience, how will they structure their work, and what do they anticipate to be their major challenges for this project.

Conveners: Dale Li (SLAC), Dr Hsiao-Mei Sherry Cho (SLAC), Prof. Karl Van Bibber (UC Berkeley), Prof. Kent Irwin (SLAC/Stanford), Prof. Lindley Winslow (MIT), Peter Graham, Prof. Reyco Henning (UNC), Dr Saptarshi Chaudhuri (Princeton University)

11:00 → 12:00 **Engineering and Management** — Varian Physics Meeting Room

- **11:00** **Engineering pitfalls and modeling capabilities at SLAC** — 30m
  Speaker: Wes Craddock (SLAC)
- **11:30** **Budgets and Planning for DOE Small Project** — 30m
  Speaker: Nadine Kurita (SLAC)

12:00 → 13:00 **Lunch** — 1h — Varian Physics Meeting Room

12:00 → 13:00 **Lunch** 1h Varian Physics Meeting Room

13:00 → 13:30 **Executive Planning: Programatic Planning for Collaboration** Varian Physics Meeting Room

13:30 → 17:30 **Determine Cyromech/Magnet Interface: Technical** Varian Physics Meeting Room

13:30 **Interface at Superconducting Shield: Strategy and Schedule** 30m
Speaker: Prof. Kent Irwin (SLAC/Stanford)

14:00 **Modeling Overview and Development** 30m
Speaker: Dr Saptarshi Chaudhuri (Princeton University)

14:30 **Constraints and Figure of Merit from Modeling** 30m
Speaker: Prof. Kent Irwin (SLAC/Stanford)

15:00 **Cryo-mechanical Overview and Development** 30m
Speaker: Dale Li (SLAC)

15:30 **Constraints from Cryo-Mechanical** 30m
Speaker: Dale Li (SLAC)

16:00 **Magnet Overview and Development** 30m
Speaker: Prof. Karl Van Bibber (UC Berkeley)

16:30 **Constraints from Magnet** 30m
Speaker: Prof. Karl Van Bibber (UC Berkeley)

17:00 **Discussion** 30m
Speaker: Prof. Kent Irwin (SLAC/Stanford)

18:30 → 19:00 **Happy Hour at British Bankers Club** 30m