DMRadio-50L introduction

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DMRadio Collaboration meeting at Stanford, CA

DMRadio-50L, focusing on hardware
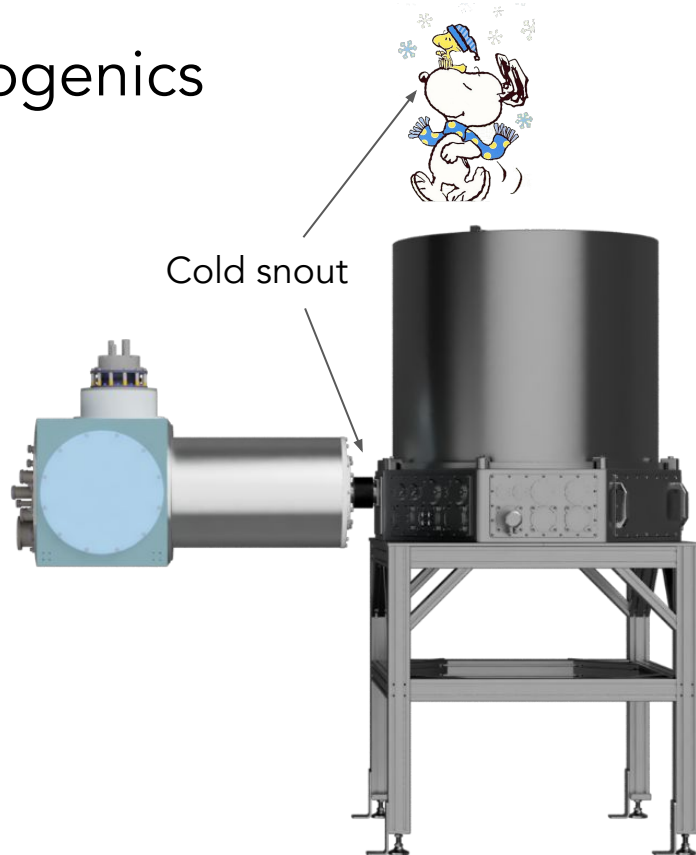
1. Cryogenics
2. De-ceiver
3. Facilities

Cryogenics

DMRadio-50L cryogenics

Cold snout

Woodstock
4 K cryostat with PT-425-RM

1 K space
20 mK space

Snoopy
Dilution refrigerator BF-LH-400
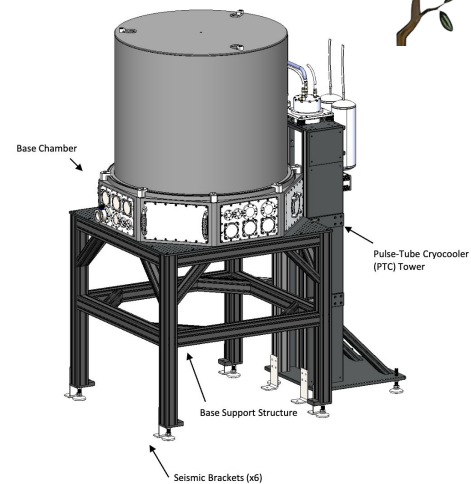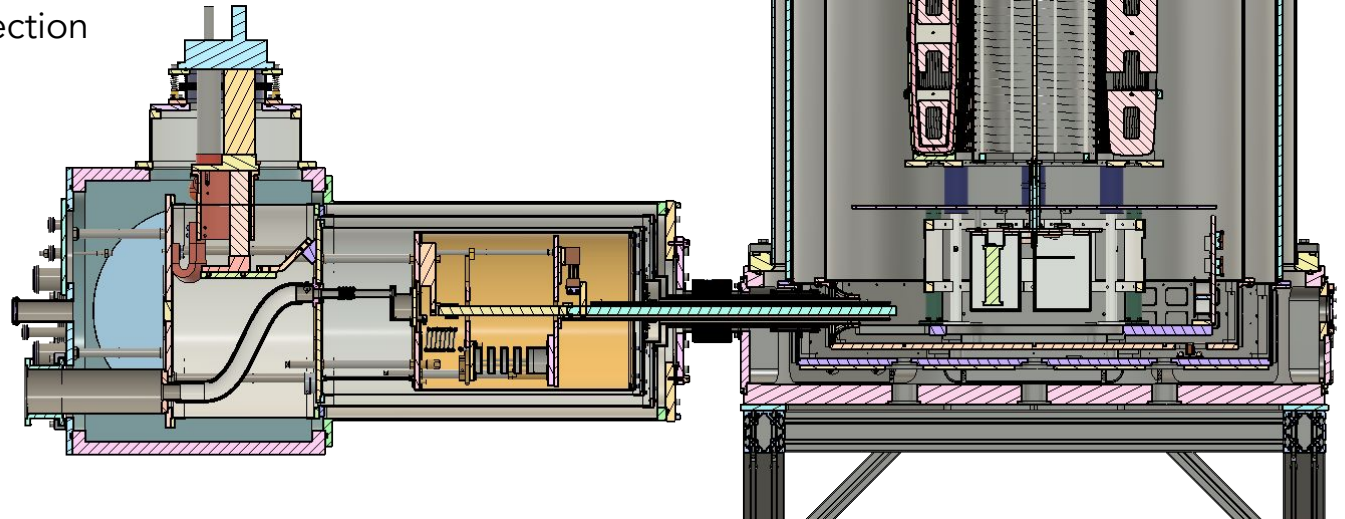
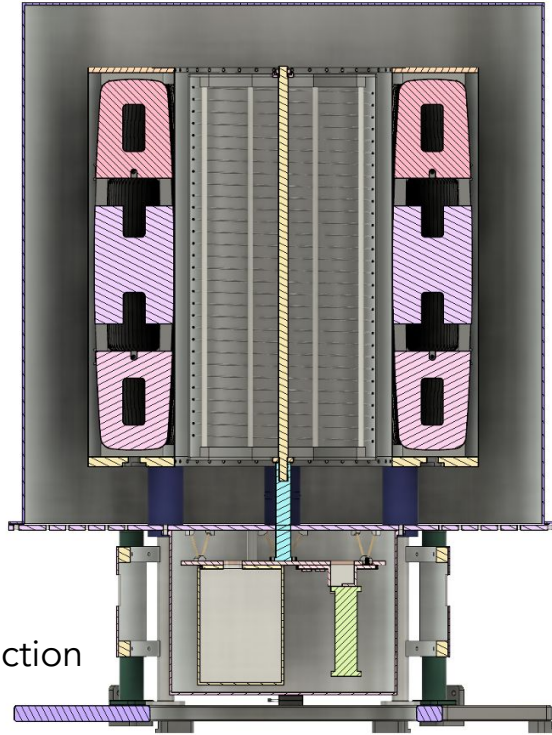# DMRadio-50L cryogenics

Snoopy

Cold snout

Woodstock

Cold snout (Aya)

- 20 mK cold finger
- 1 K cold finger
- 4 K / 1 K puck (cold finger support)
- 4 K shield
- 40 K shield
- Vacuum flexible connection
- 40 K flexible connection
- 4 K flexible connection

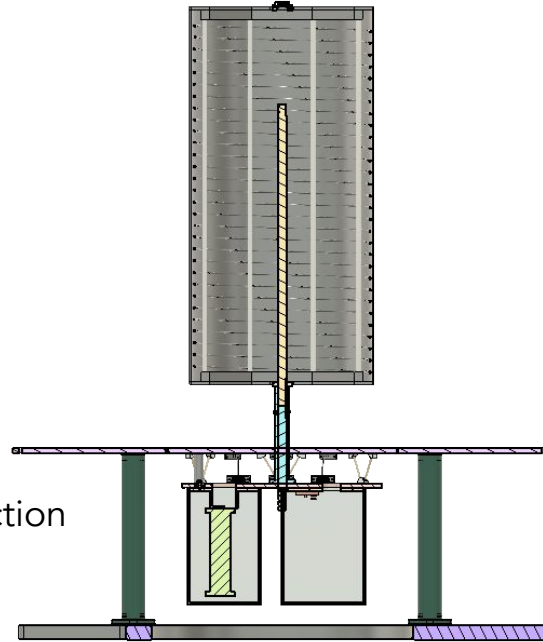Currently being tested

1 K space (Tori)

- 1 K shield

- 1 K plate

- 1 K standoffs
- 1 K CF connection

We need to design and build a 1 K space that accommodate its interfaces.

20 mK space (Jessica and Maria Salatino)

- Inductor support
- 20 mK standoffs
- 20 mK plate
- 20 mK CF connection
- Relevant shields

We need to design and build a 20 mK space that accommodate its interfaces.

DMRadio-50L cryogenics to-dos

Before 50L is assembled and operational, need to:
- Get Snoopy into prime operating shape (Maria) scroll pump tip seal, extra still support
- Achieve target gradients with cold snout testing (Aya) see Aya's talk 8/5
- Build 4 K flexible connection (Princeton) design & build
- Build 40 K flexible connection (Aya) design & build
- Build vacuum adapter plate to bellows (Aya) design & build
- Build and validate Woodstock (Four Nine Design) build & validate
- Design and make wiring for Woodstock (Nicholas) SQUID wiring, other wiring?
- Design and build 4 K cryoperm shield (Nicholas) roughly designed
- Design and build 1 K plate and shield (Tori) see Tori's talk 8/5
- Design and build 20 mK plate and accessories (Jessica and Maria Salatino) see Jessica's and Maria's talks 8/5

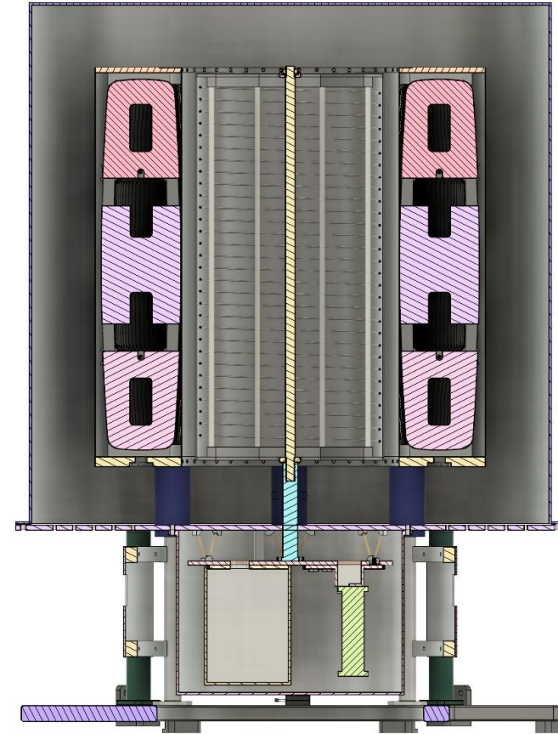# De-ceiver

DMRadio-50L "De-ceiver"

Detector + Receiver = "De-ceiver"

"Detector"
- Magnet
- Sheath

"Receiver"
- Resonator - inductor, corset
- Resonator - capacitor
- Wings (not shown), attach to corset and surround the sheath
- Tunable transformer
- SQUID

DMRadio-50L magnet assembly

- Mandrel
- Spacers
- Connector bracket
- Structural leg assembly (four structural legs, support rings, shear plates, dielectric break "knee")
- Thermal leg assembly (two thermal legs, two thermal braids)
- Nb skirts aka pant legs (shields thermal and structural legs in 1 K space)
- Snorkel (shields SC leads in 1 K space)
- Diode tower
- HTS lead assembly aka "stapler"
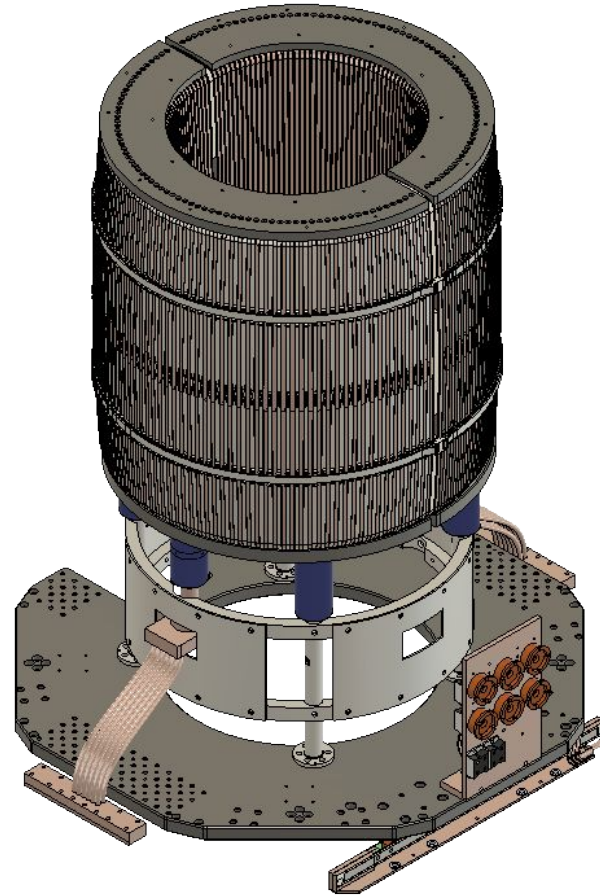
DMRadio-50L "De-ceiver"

Before 50L is assembled and operational, need to:
- Build and validate toroidal magnet (SSI, Chelsea) see Chelsea's talk 8/6
- Finalize connector bracket design and build (Nicholas) see Nicholas talk 8/6
- Finalize / gather together the rest of the magnet components
- Design and build sheath (Nicholas) (Jessica, Johny, Alex, Nicholas, etc)
- Design and build tunable transformer (Joe) see Joe's talk 8/6
- Design and build SQUID board and wiring (Nicholas)
- Design and build resonator (Roman, Joe)
- Make sure de-ceiver is possible to assemble! (Chiara) see Chiara's talk 8/6

Facilities

DMRadio-50L location: Stanford PAB room B02
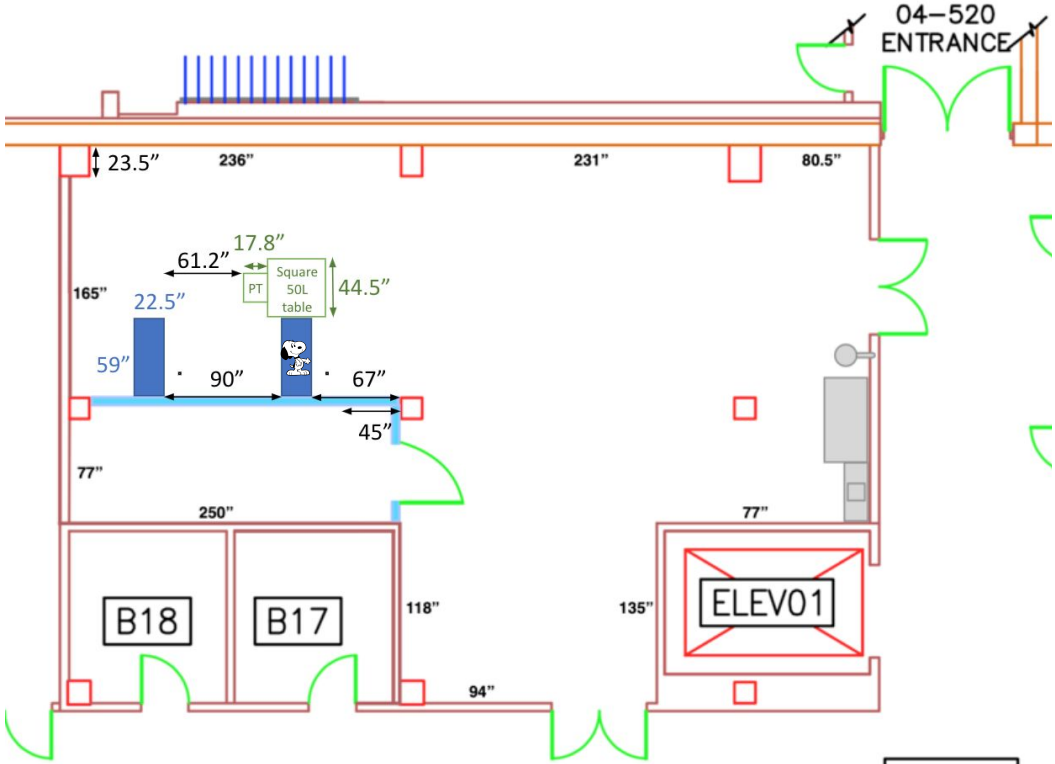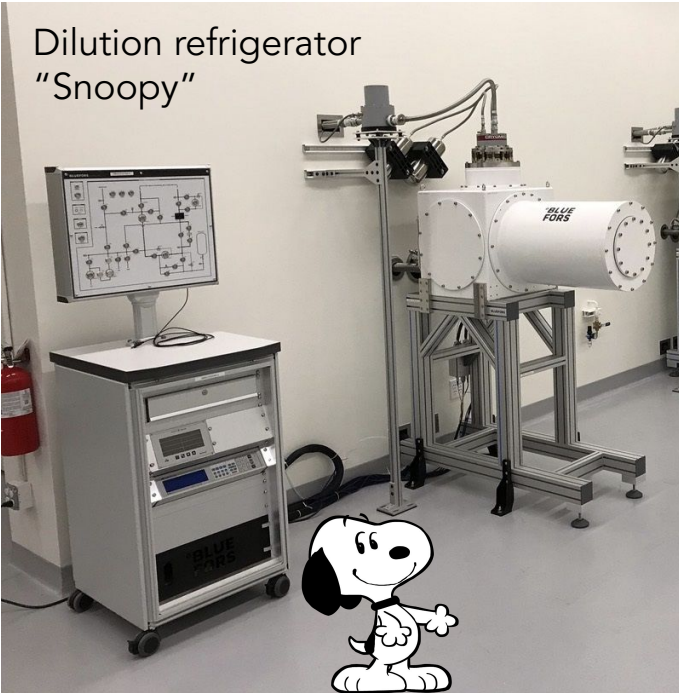
DMRadio-50L location: Stanford PAB room B02

Before 50L is assembled and operational, need to:
- Install new 3-phase outlet in the dog house
- Tee-off cooling water in the dog house
- Raise room lights
- Design and build lifting and assembly structures (room temperature stand, cage, crane system)

DMRadio-50L location: Stanford PAB room B02

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(Maria) quote received, need to schedule work

(Maria) to-do

(Maria) to-do

(Johny) Room temp stand design and build
(??) De-ceiver cage is mostly designed, who should build?
(Four Nine Design) Crane system
(Maria) Certification of crane system
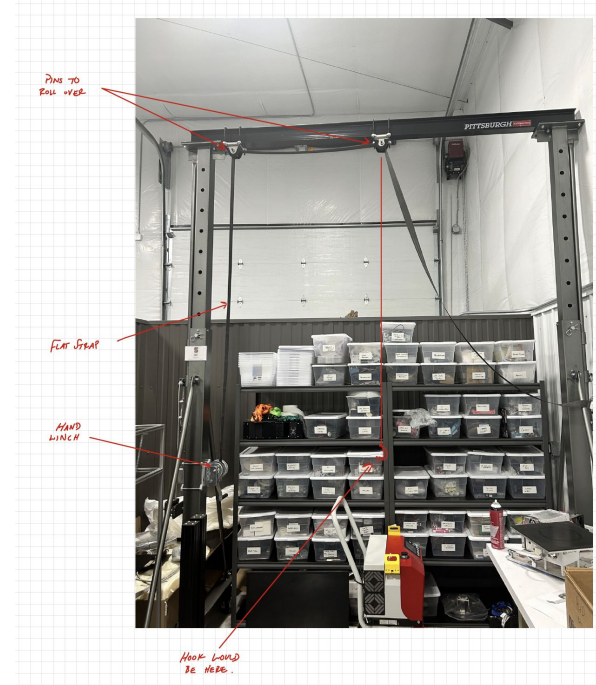
Room-temperature lifting and assembly structures

Room temperature stand
(see Johny's talk on 8/6)

Cage (who will build?)

Crane system (Four Nine)

List of components

Cryogenics: Snoopy, Woodstock, cold snout, 1 K space, 20 mK space

De-ceiver: magnet, sheath, resonator, SQUID, tunable transformer

Facilities: room temperature stand, cage, crane system

DAQ! see Pam's and Chelsea's talks 8/5 and DAQ-tivity

Thanks for listening!