

# Axion Activities at IBS/CAPP

## Enhancing the scanning rate

### Cryogenics (T)

Lowering thermal noise

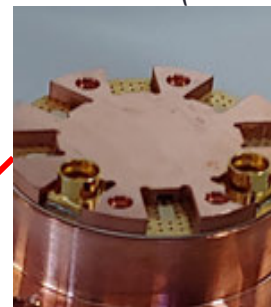


$$\frac{df}{dt} \sim B^4 V^2 C^2 Q_L T_{\text{syst}}^{-2}$$

RF readout chain

### Quantum noise limited amplifier (T)

Amplification w/ noise squeezing  
(U. of Tokyo & RIKEN)

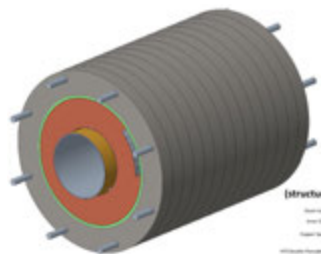


JPA gain measurement:  
20 dB @ 2.3 GHz

Functional JPA w/ in-house expertise

### High field HTS Magnet (B)

Boosting  $a \rightarrow \gamma\gamma$  conversion rate



HTS 25T/100mm  
w/ BNL

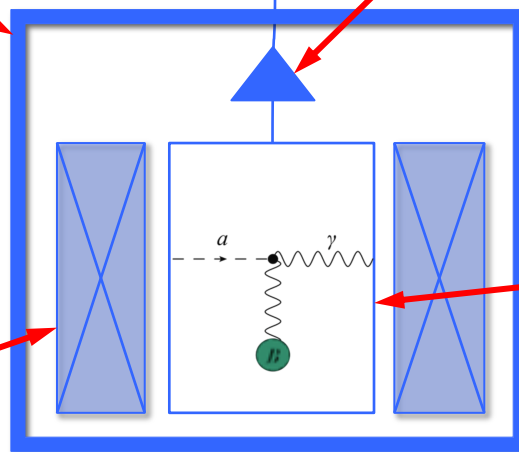
(funding limited)

IEEE T. Appl. Supercon. 29, 5 (2019)

LTS 12T/320mm  
(Oxford, 2020)

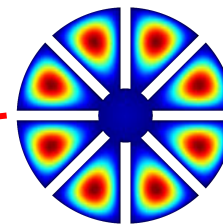


Axion-photon conversion  
(Primakoff effect)

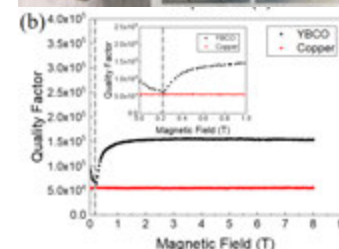
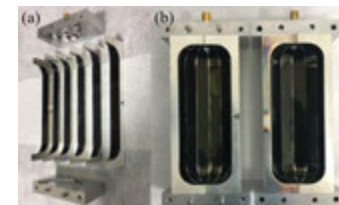


### Microwave resonator (V,C,Q)

High frequency / high Q factor



Pizza cavity  
for high frequency  
Phys. Lett. B 777 412 2018



SC (YBCO) cavity  
under high B field

Arxiv: 1904.05111