**Abstract:**

Lynx is an x-ray telescope, one of four large satellite mission concepts currently being studied by NASA to be the next astrophysics flagship mission after WFIRST. One of Lynx’s three instruments is an imaging spectrometer consisting of an x-ray microcalorimeter behind an X-ray optic with an angular resolution of 0.5 arc-seconds and approximately 3 arc-minutes of area at 1 keV. This instrument will provide unparalleled diagnostics of distant extended structures and in particular will allow the detailed study of the role of cosmic feedback in the evolution of the Universe. We discuss the design and read-out of the of the array configuration including a sub-array options for increasing the capabilities to maximise the scientific return of the Lynx observatory.

**Lynx: Revealing the Invisible Universe**

**Lynx: Many Science Drivers:**
- First Black Holes in the Universe and their co-evolution with Galaxies
- Cycles of High-energy Baryons in and out of Galaxies
- Feedback from Stars, Supernovae, and Black Holes, in all settings
- X-ray counterparts of GW events and multi-wavelength observations
- Stellar Lifecycles
- Feedback from SNRs, AGN, and black holes
- Formation and evolution of Galaxies
- First Black Holes in the Universe and their co-evolution with Galaxies
- Cycles of Hot Baryons in and out of Galaxies

**Recent update:** 20-absorber TES hydra

- absorbs on 50 μm pitch
- 3.4 eV demonstrated at 5.4 keV
- see poster P-59.5 Smith et al.

**Notional focal plane assembly layout:**

**Small-pixel designs**

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<th>12 x 12 array on 35 μm pitch:</th>
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**Focal plane design - still being refined**

**Hydras:**

- Extensive use of hydra concept with up to 25 absorbers per TES in main array:

**Read-out:**

- Microwave [GHz] SQUID Resonators are advancing rapidly, have the most potential, and the baseline read-out for Lynx calorimeter

**Optimization of hydra design for read-out**

- Introduction of optimal Requiem inductors to minimize skew rate and maintain position discrimination.
- Assume first pixel is removed, and its heat capacity added to TES sensor

**Conclusions/outlook**

- A new instrument has been designed representing a new generation in scale of X-ray microcalorimeter arrays
- Over 100,000 pixels
- New wiring schemes for these arrays are being developed
- Design exists for flight implementation of microwave SQUID read-out, assuming microwave read-out skew-rate capabilities already demonstrated.