Review Summary

- S6 Einstein@Home All-Sky “Bucket” CW search
  **Investigators:** Maria Alessandra Papa, Heinz-Bernd Eggenstein, David Keitel, Irene Di Palma, Reinhard Prix, Sinead Walsh
  **Reviewers:** Pia Astone, Teviet Creighton

- Semicohherent $F$-statistic search; timebase $90 \times 60$ hr, frequencies 50–510 Hz, spindowns as strong as $-0.084$ Hz/yr
  - Deepest search yet at those frequencies: 90% frequentist limits down to $\sim 6 \times 10^{-24}$ in $h_0$
  - Targeted only “clean” 0.05 Hz bands (89% of spectral range); upper limits collected in 0.5 Hz bands.
  - Outliers consistent with Gaussian ($\chi^2$) noise.

- 17 review calls plus 3-day F2F meeting: [https://wiki.ligo.org/CW/S6BucketReview](https://wiki.ligo.org/CW/S6BucketReview)
Review Summary

• Basic $\mathcal{F}$-stat engine same as previous searches; review considered:
  
  **Data selection:** “Clean” bands selected by heuristic procedure.
  ⭐ Reviewers were convinced it is reasonable, though false dismissal rate is not quantifiable.
  ⭐ Excluded bands explicitly noted; may be targeted in future.

  **Loudest candidate selection:**
  ⭐ Reviewed new code for clustering, vetoing, ranking candidates.
  ⭐ New “line-robust” statistic: Bayesian test among “signal”, “noise”, “line” hypotheses; along with legacy approximants.

• Reviewers satisfied that method and results are reasonable.

**Paper:** LIGO-P1600156

• Reviewers have signed off; open to feedback from collaboration.