

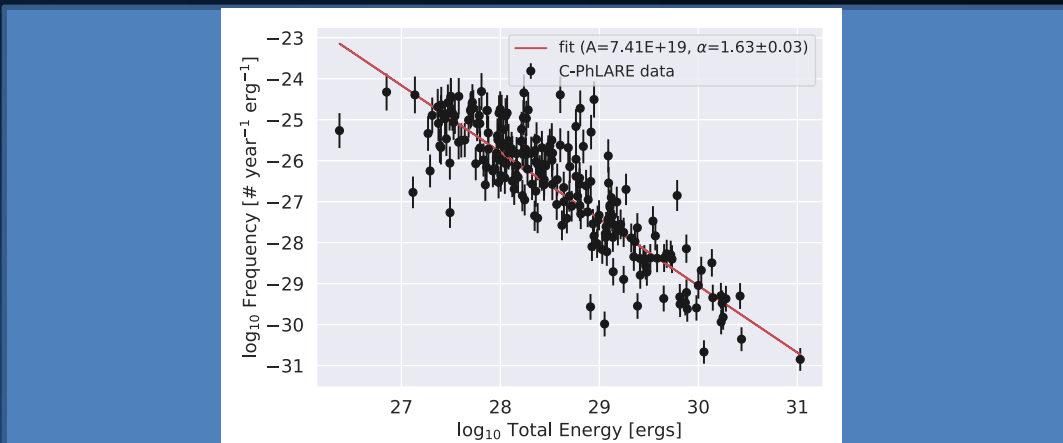
“et al.” to the extreme: 1,002 authors for solar flare analysis

Over three semesters at CU Boulder’s physics department, over 1400 undergrads computed the soft X-ray energy of solar flares

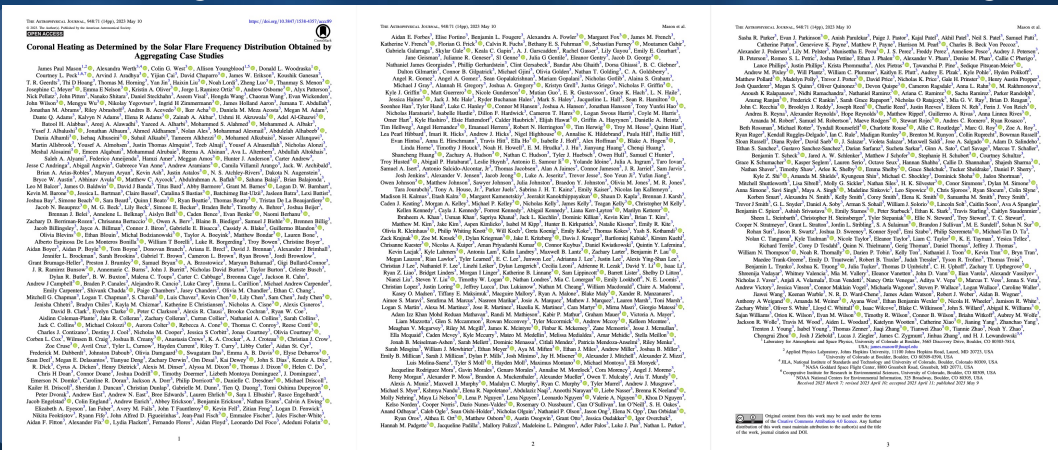
- How is the corona $\sim 10^6$ Kelvin while the “surface” is only $\sim 6 \times 10^3$ Kelvin? Lots of nanoflares or Alfvén waves?
- Students each analyzed a flare: subtracting background, determining duration, computing energy. Peer reviewed each others work.

Aggregated all the results into a histogram (see figure)

- If slope of histogram (alpha) > 2 then there are enough nanoflares to transport sufficient heat to the corona to explain the temperature delta. We find alpha < 2 = evidence against nanoflares and de facto in support of Alfvén waves.



Flare frequency distribution. Key result is value of alpha listed in the legend, which is < 2 . ∴ nanoflares ≠ coronal heating



The first 3 pages of the paper is nothing but listing the names