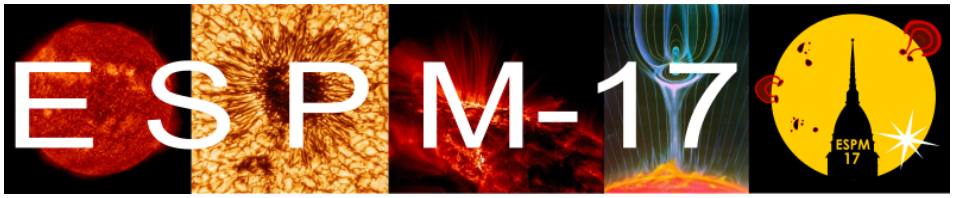

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DeepFiltering: Utilising Generative Networks to Create Quality Images of Coronal Rain

Coronal rain can be a key indicator of coronal heating taking place. To resolve the coronal heating problem it behoves us to fully investigate this link across the full disk of the Sun. There is no lack of observational data, but currently this data is inadequate for a complete analysis of the phenomenon to be carried out. The AIA 304 channel provides the best dataset for coronal rain observations. However, besides the cool component from He II emission, the passband also includes hotter coronal emission from other ions. The contribution of this hotter emission can become comparable to that of the cool emission in off-limb observations, leading to ambiguity when determining the temperature of structures. Conversely, IRIS/SJI 1400 provides higher resolution images with far less ambiguity between hot and cool emission, and therefore higher contrast between both the rain and the surrounding corona. Unfortunately, the small field-of-view of the satellite makes it ill-suited for large scale statistical analysis of the phenomenon.

We present a novel approach to this problem by training a CycleGAN based algorithm to undertake a style translation between AIA 304 images and those belonging to IRIS 1400. This produces a model which can optimally, and without the need of additional data, convert AIA 304 images into those unhampered by the large temperature ambiguity. The structures in these images are then compared to the original IRIS 1400 images, as well as those produced from alternative methods, to show the reliability of this method going forwards.

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Session Classification: Coffee break and poster session 1

Track Classification: Energy and mass transfer throughout the solar atmosphere and structures within