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STABILITY OF A PRE-ERUPTIVE FLUX ROPE FORMED VIA FLUX EMERGENCE ON THE SUN

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We study the stability of a pre-eruptive magnetic structure on the Sun formed through the emergence of magnetic field from the solar interior into the solar atmosphere. Our focus is on the self-consistent formation of a pre-eruptive structure and its dynamic nature, not prescribing some magnetic configuration for a pre-eruptive structure nor performing kinematic emergence. The study shows that a flux rope, the core of a pre-eruptive structure formed in the corona is fairly stable while the outer magnetic field overlying this core is always in a dynamic state. This shows that a flux rope does not erupt immediately after it forms in the corona, rather it provides some stable phase during which a filament/prominence can form and develop inside the flux rope. We also consider a physical process for destabilizing a flux rope and a transition of the shape of an emerging field line may play a key role in global eruption.