

SHINE Session 13:

How can we improve our understanding of the formation and magnetic nature of filament channels and the mechanisms by which they erupt?

- Follow-up on our Shine 2019 session on pre-eruptive configurations
- We extended the discussion to eruption-initiation mechanism(s)
(...we have been neglecting this important issue lately...)

Present consensus on eruptions:

- Pre-eruptive configuration: current-carrying core field (filament channel) stabilized by ambient field
- Eruption occurs when stable equilibrium cannot be maintained

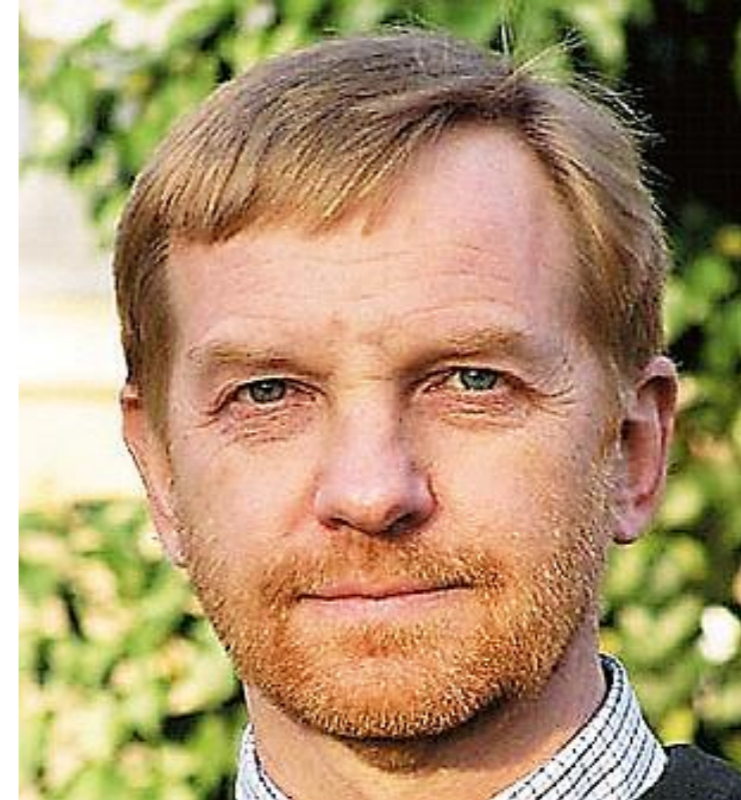
Main discussion topics (open questions)

- How are pre-eruptive configurations (filament channels) formed?
- What is their magnetic nature *before* an eruption? (sheared arcade (**SMA**) or flux rope (**MFR**)?)
- What is the (main) physical mechanism that initiates/drives eruptions? (**Reconnection** or **Instability**?)

New Format: Discussion and Debate



Guillaume Aulanier (SMA)



Bernhard Kliem (MFR)

- Two "scene-setting" speakers presented (partly) different views
- Q & A with the audience + debate between speakers
- We used **slido** to encourage student participation

We would appreciate your feedback!

- We discussed various aspects of the problem (too many to list...)

One main point: can eruption observations reveal the nature of the pre-eruptive structure?

- ICMEs twist-distribution? **Unlikely...**
- Temperature distribution in CME cross-sections? **Disputed...**
- Morphology of flare ribbons (hooks)? **Promising...**

Some Takeaways

- Controversy less strong than it used to be (but Spiro wasn't there...)
- Strongly sheared SMAs and weakly twisted MFRs similar, e.g., "hollow-core" configurations (probably most realistic)
- Reconnection & MFR instability closely coupled ("feedback"), but respective contributions to CME acceleration still unclear
- Initiation mechanism: more modeling needed (e.g., compare SMA vs. MFR model in the same background configuration; test more realistic [inhomogeneous] flux cancellation)

Next SHINE: focus more on eruption mechanisms