

M04a **3D MHD modeling of solar flares (I)**

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We developed 3D MHD numerical code to investigate several important 3D physical processes in flares, such as

- I. emergence of sheared or twisted flux tubes and their reconnection with overlying fields,
- II. eruption of twisted flux rope (plasmoid) whose footpoints are line-tied to the chromosphere,
- III. interchange instability and resulting generation of turbulence in the high pressure region behind the fast shock produced by the reconnection.

These are related with the flare evolution from preflare to impulsive phase. As a first step of this work, we will talk about the features of this code and how we applied this to study the above subjects. Then we will discuss the fundamental physics of 3D MHD evolution of flares by using the simulation results. Finally, we will compare the simulation results with actual observations.