

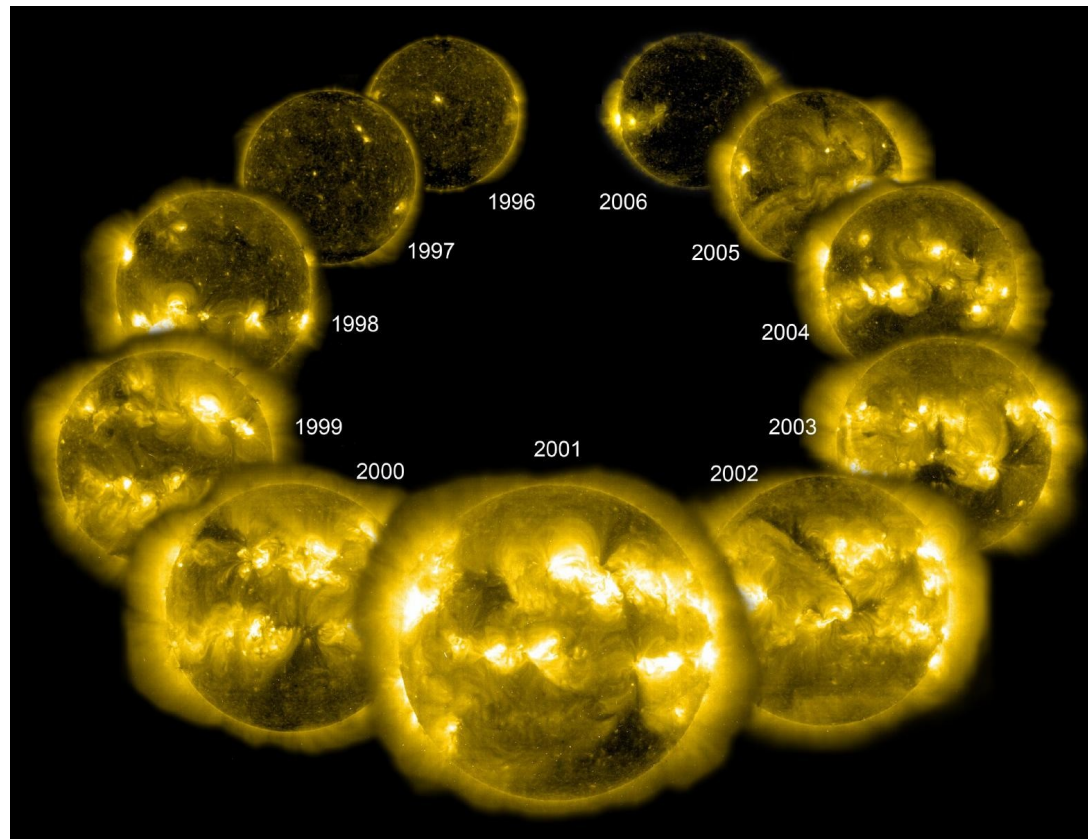
Diagnóstico de explosões solares em microondas
através da reconstrução da dinâmica de elétrons
injetados em um campo magnético construído pela
teoria do campo livre de forças

Workshop da pós graduação da DAS/INPE
2012

Tereza Satiko Nishida Pinto

Orientadores: Dr. Joaquim Costa & Dr. Paulo Simões

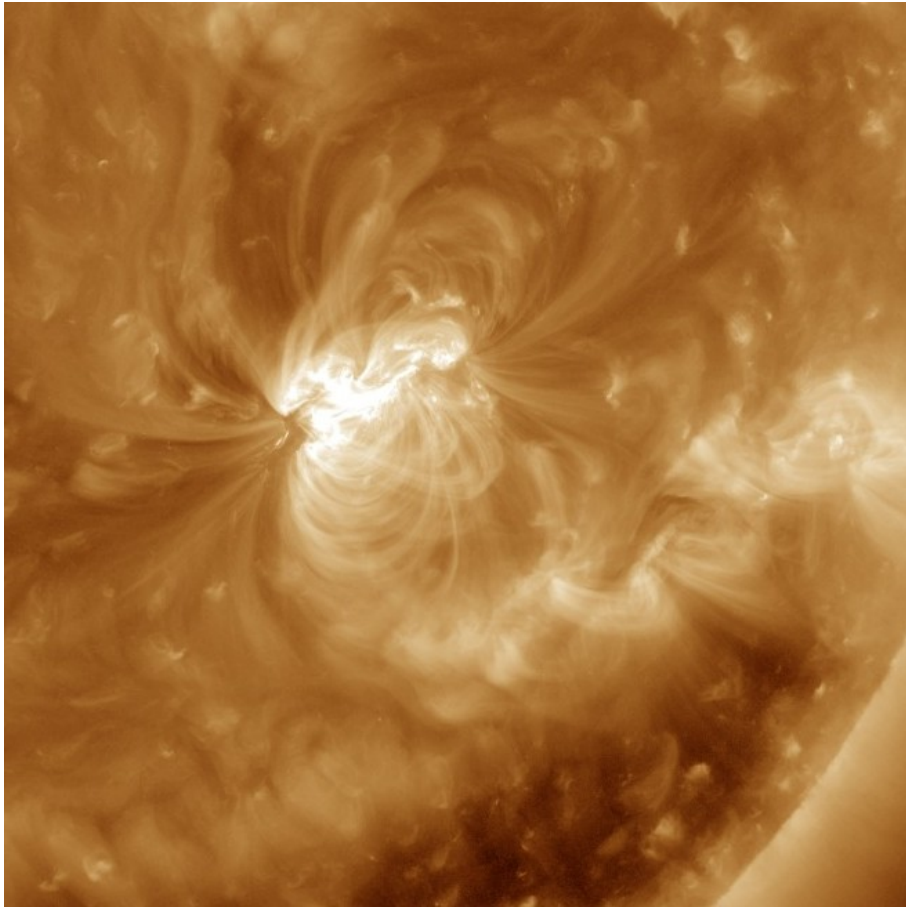
Ciclo Solar



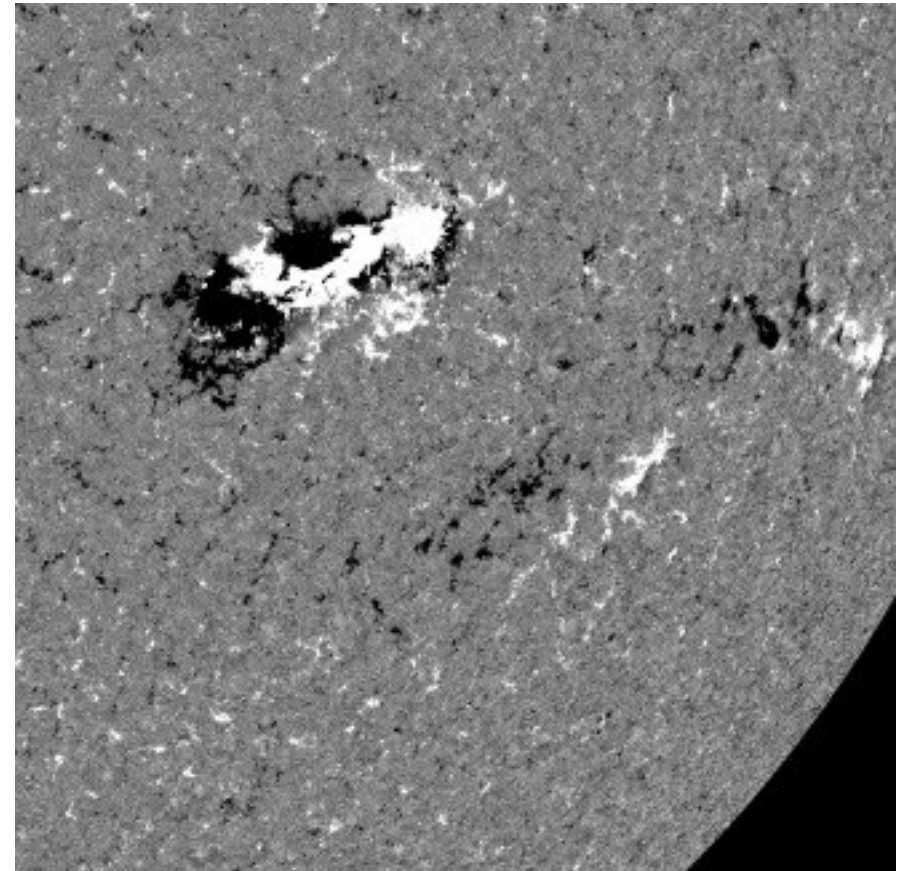
EMBRACE/INPE

EIT/SoHO

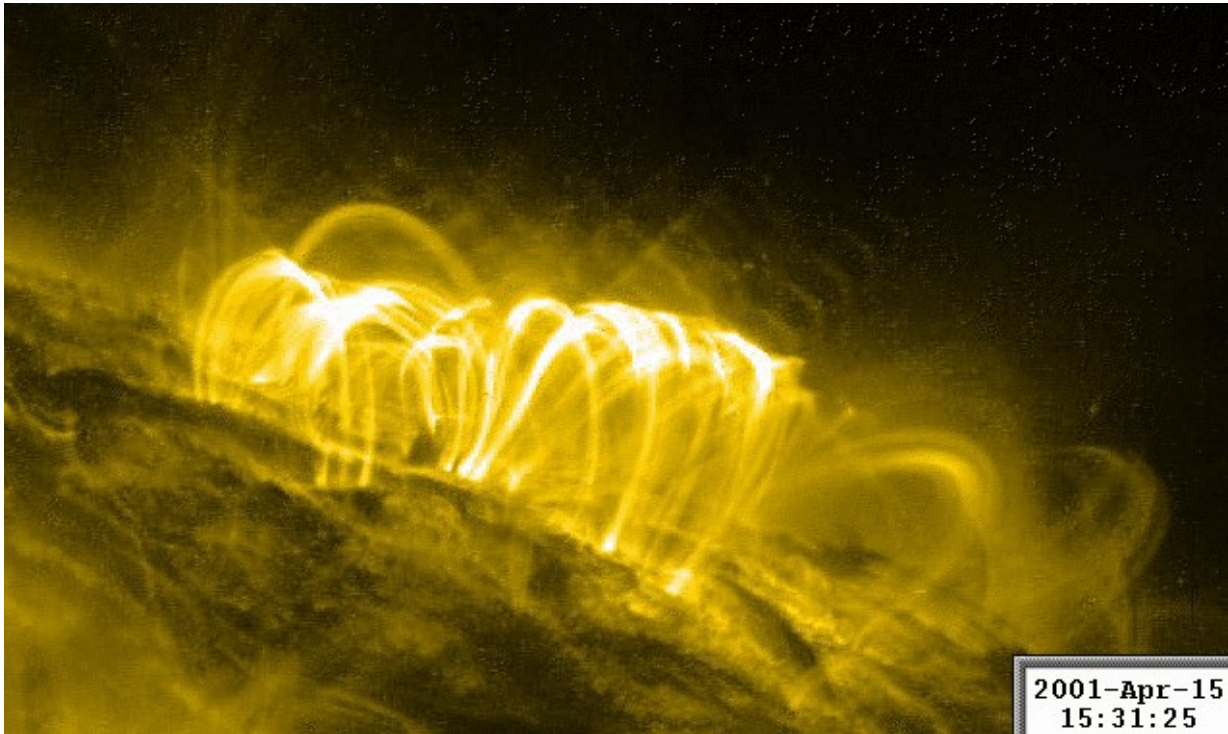
Região ativa NOAA 1158 (16/02/2011)



AIA/SDO 193 Å

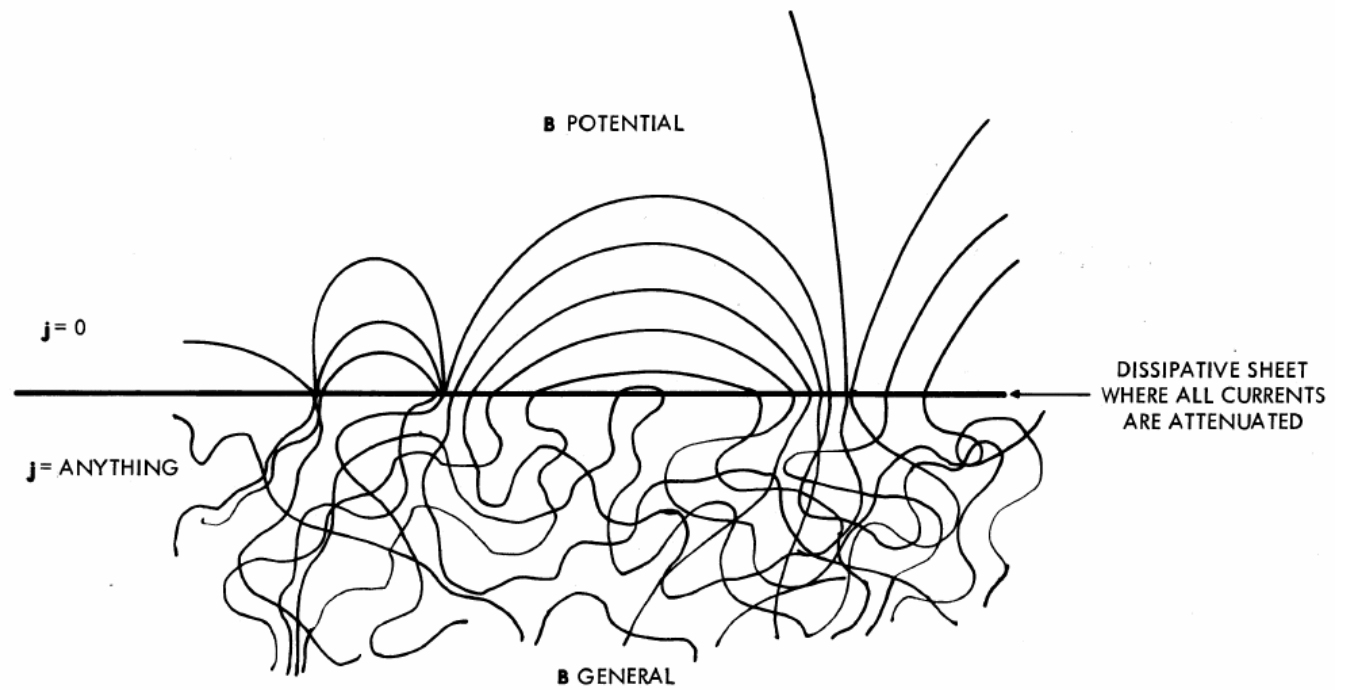


HMI/SDO

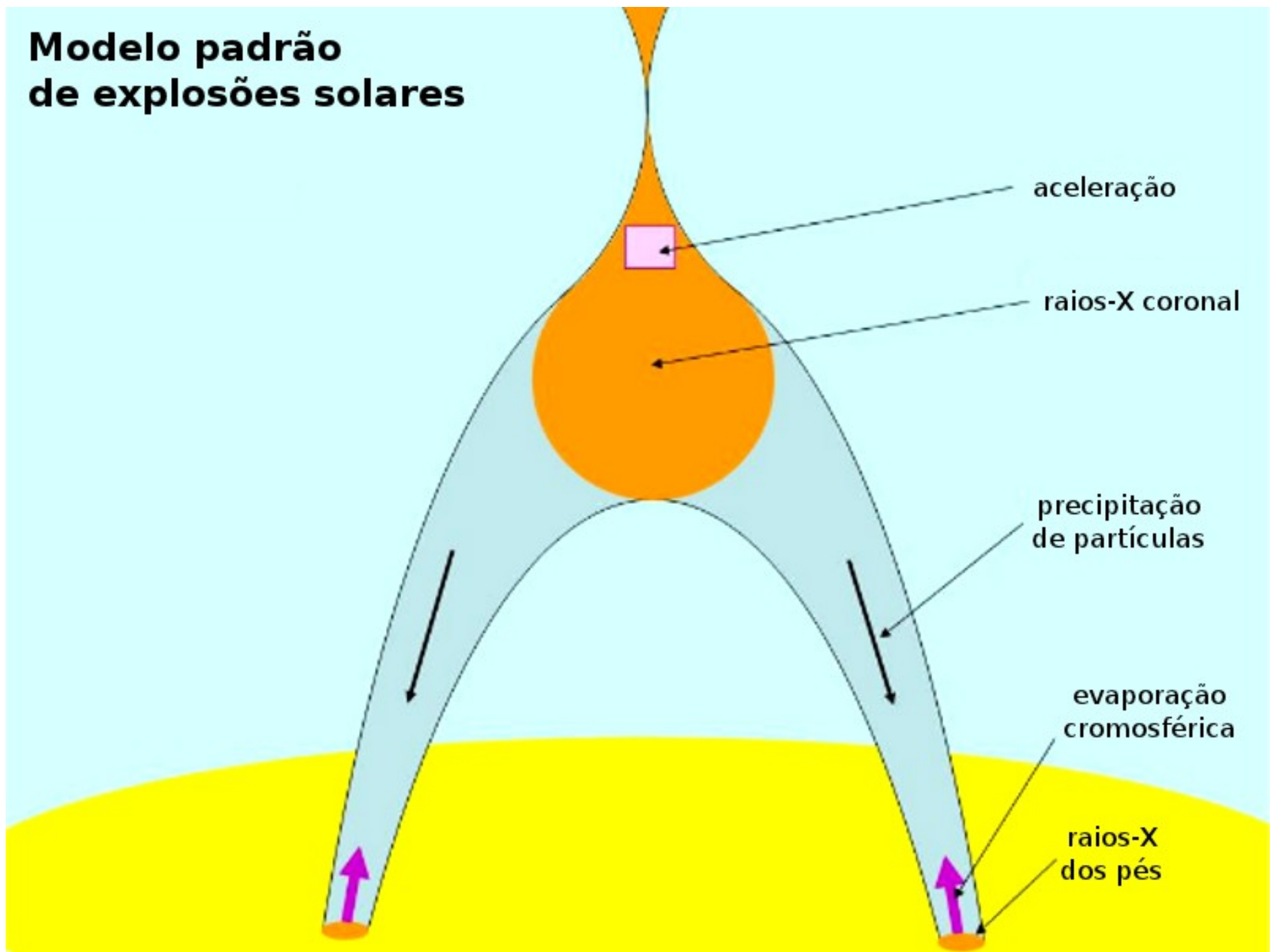


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TRACE

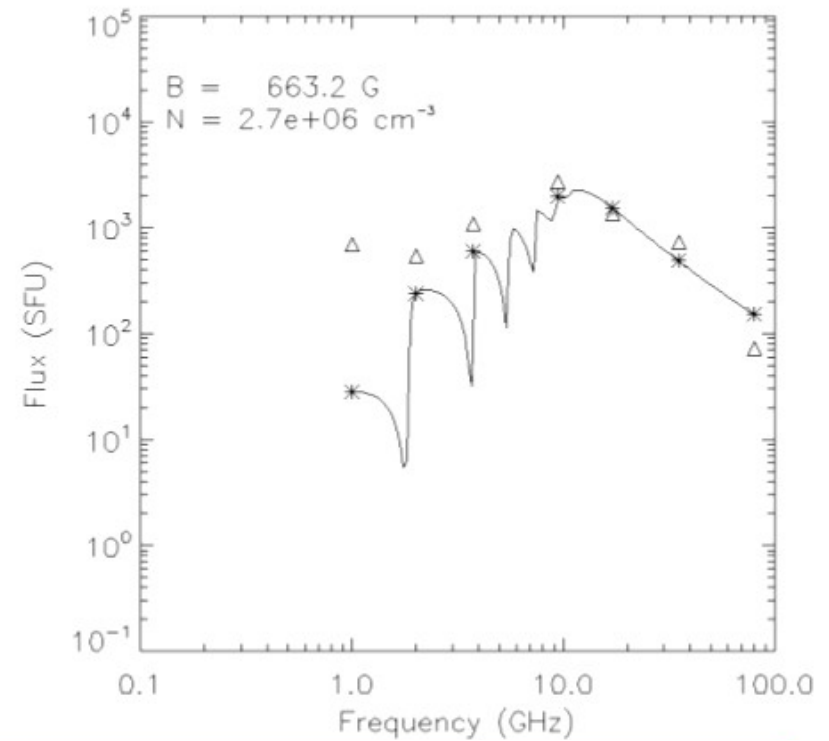
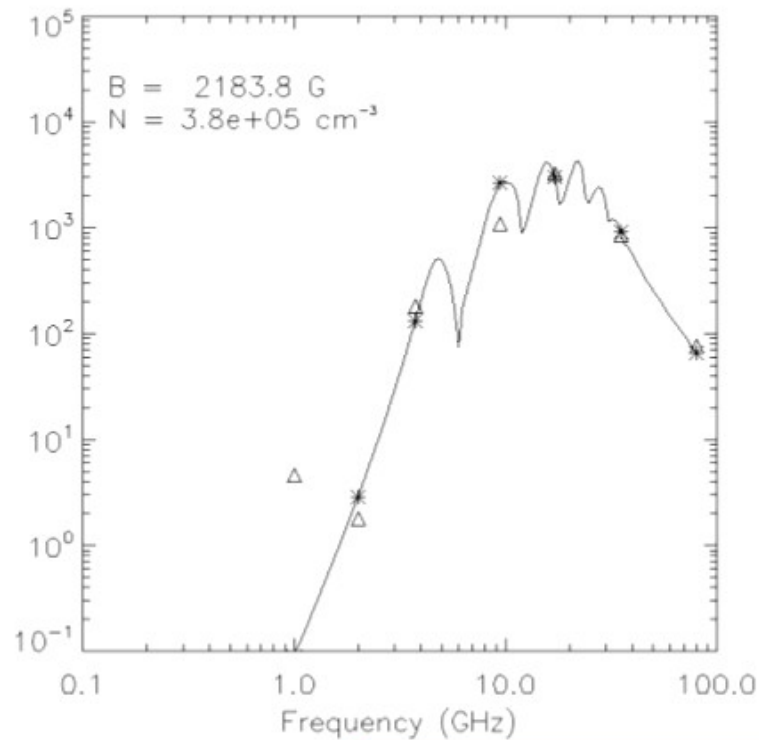
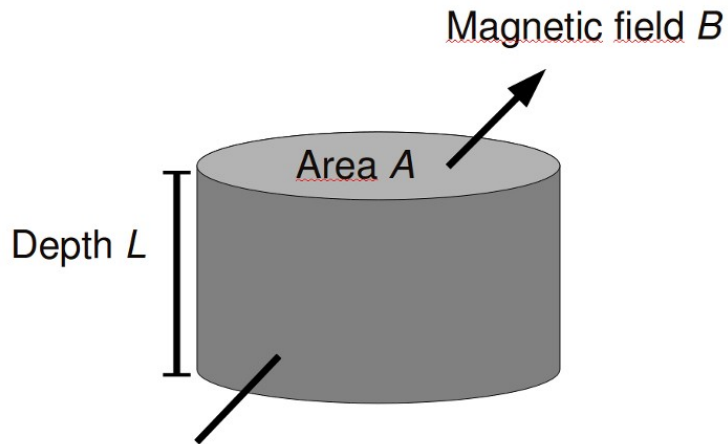


Modelo padrão de explosões solares

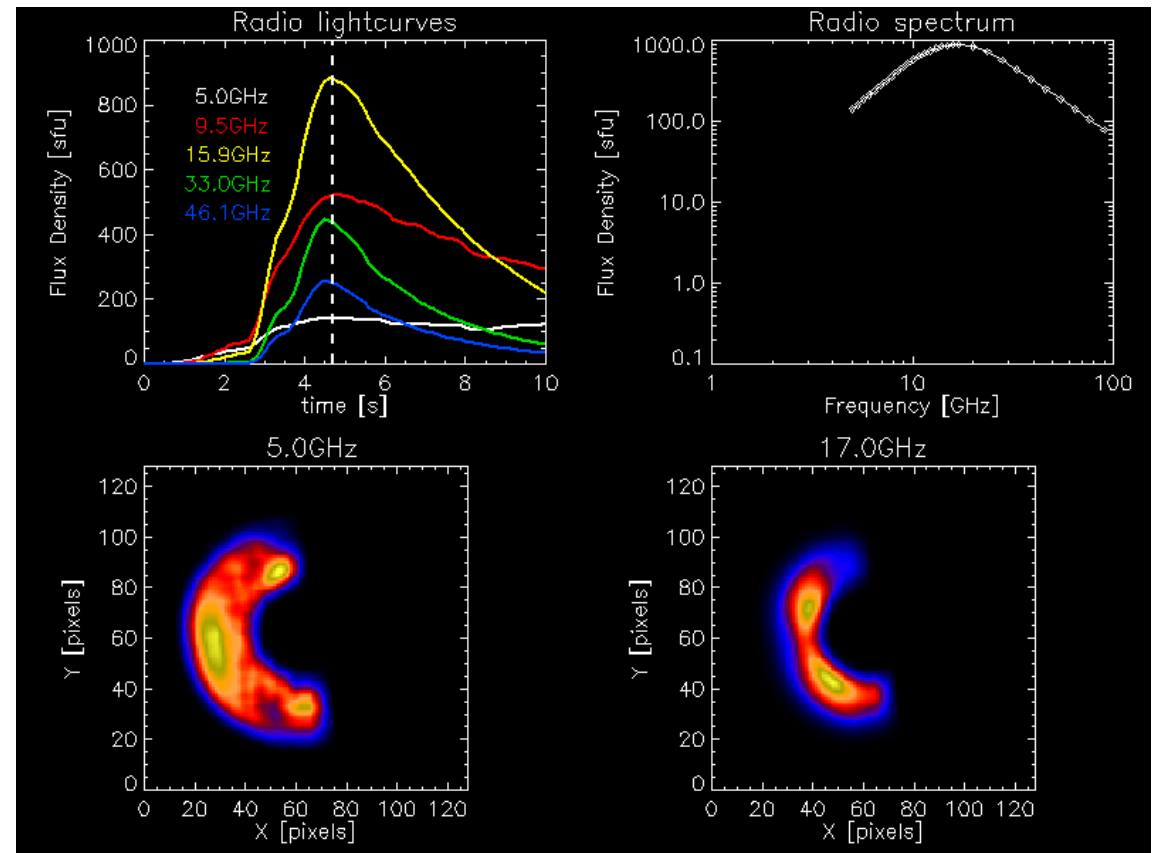
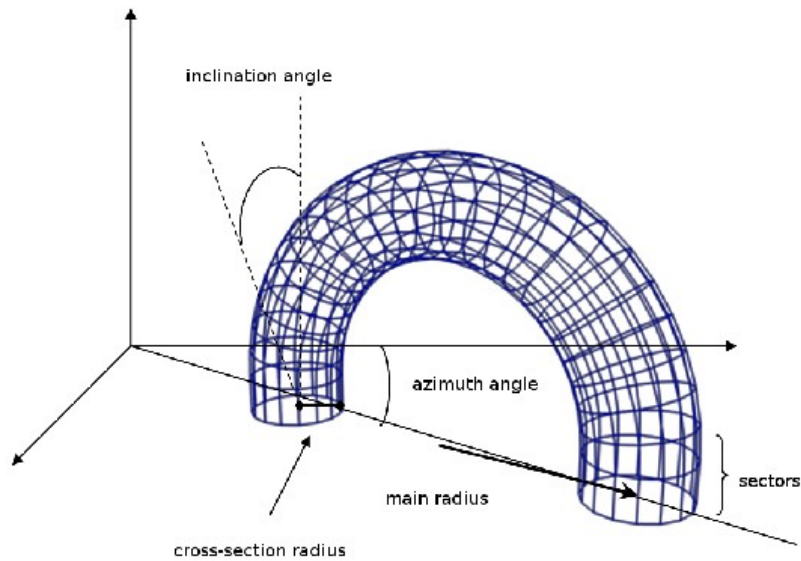


Inferir propriedades do ambiente de explosão solar a partir de um campo livre de forças aplicado à transferência radiativa em microondas. Para definir o campo e o perfil de distribuição eletrônica será utilizado um método de otimização.

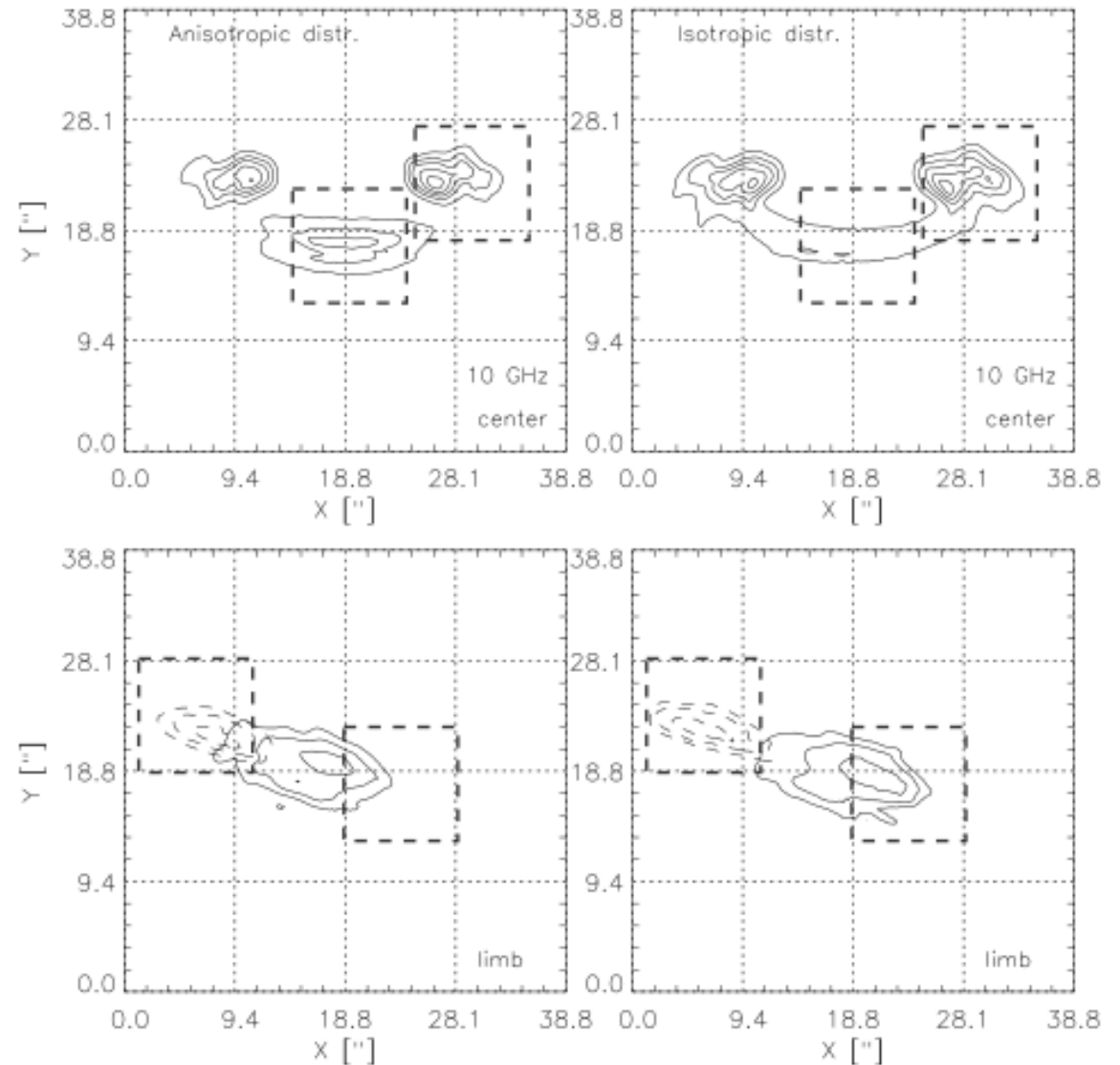
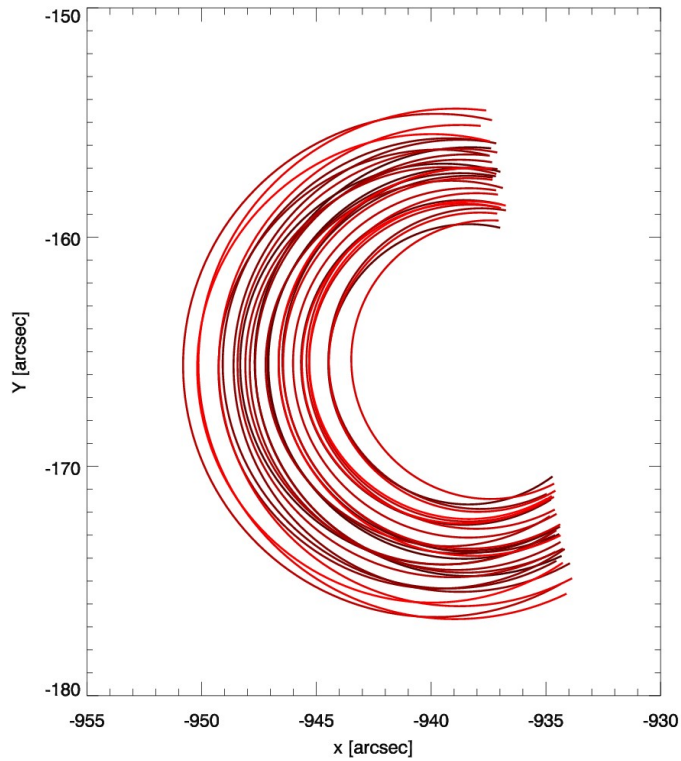
Modelo de campo homogêneo



Modelo de tubo



Modelo de conjunto de linhas



Campo magnético livre de forças

Equações do campo magnético livre de forças:

$$\nabla \times \vec{B} = \alpha \vec{B}$$

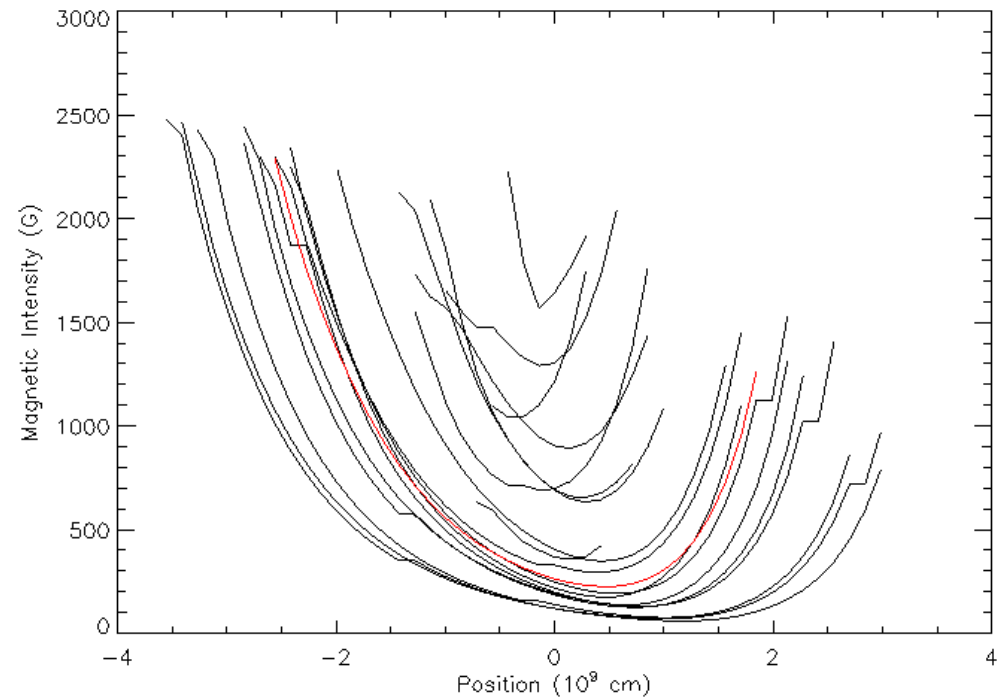
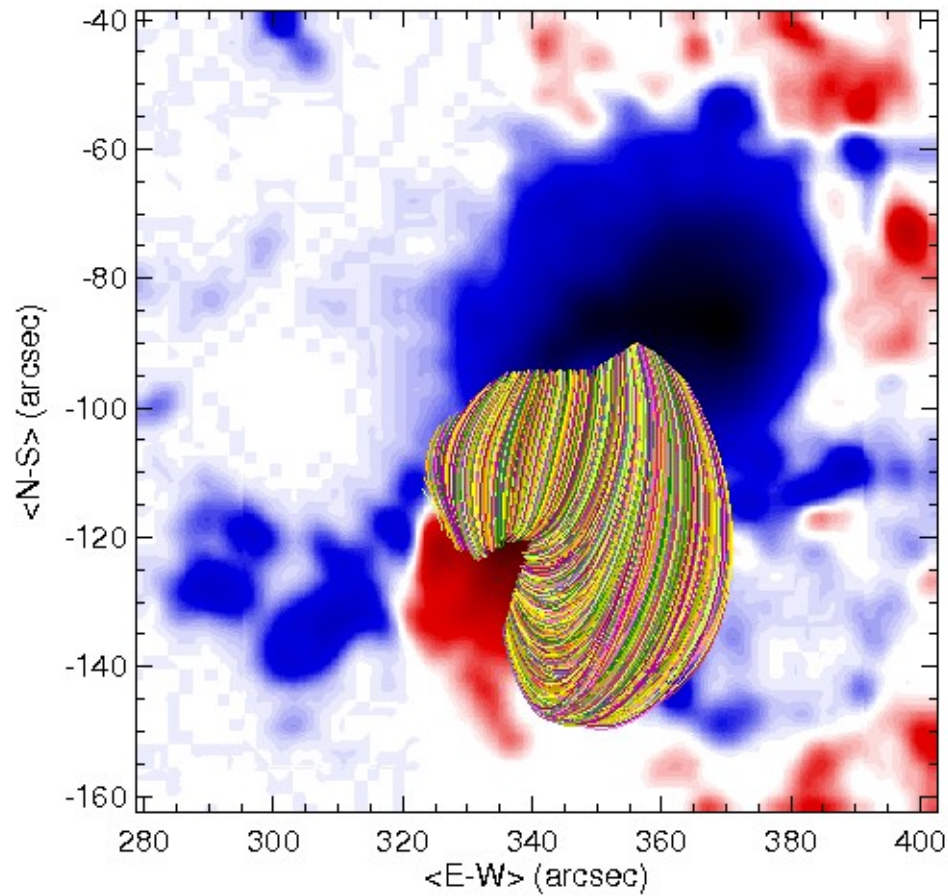
$$\vec{B} \cdot \nabla \alpha = 0$$

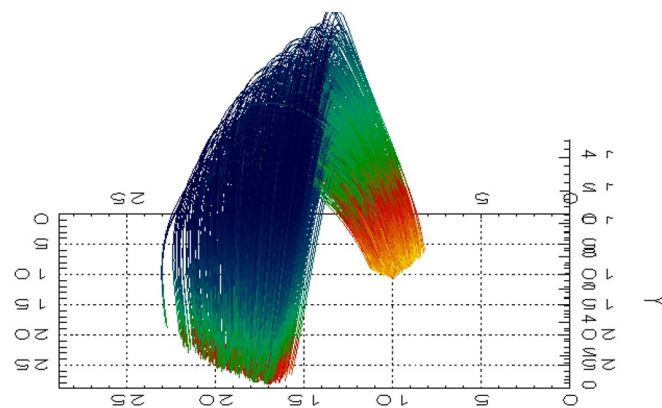
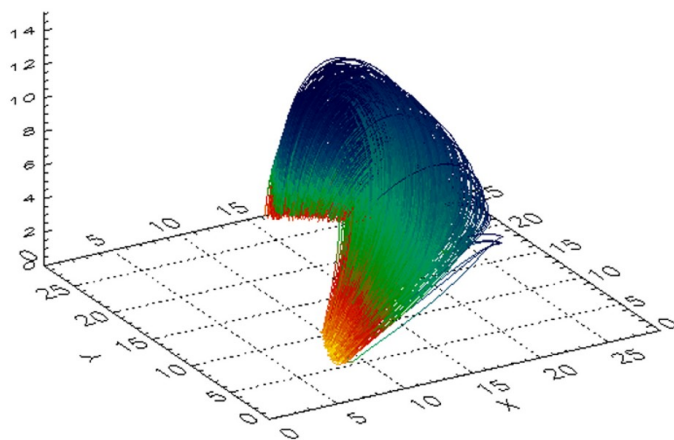
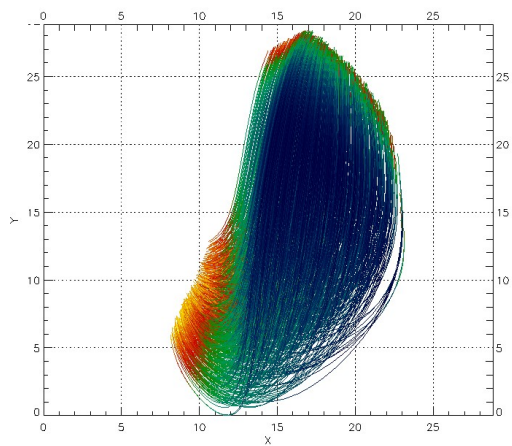
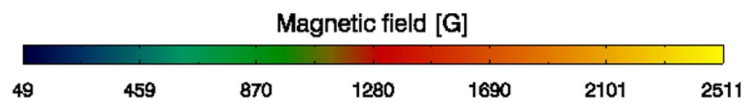
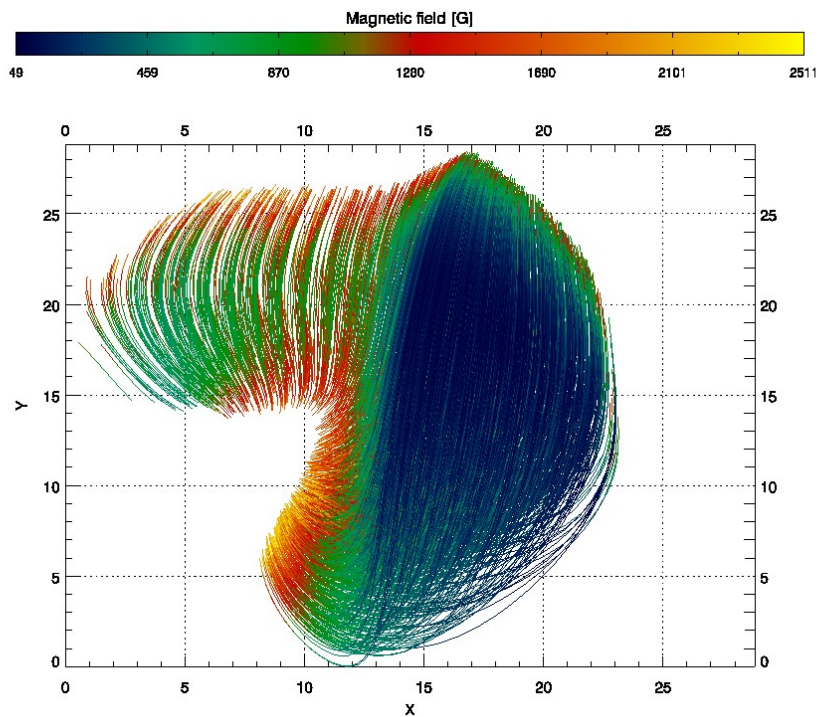
$$\nabla \cdot \vec{B} = 0$$

α é uma função da posição e determina a distribuição de correntes no volume. Existem os casos particulares:

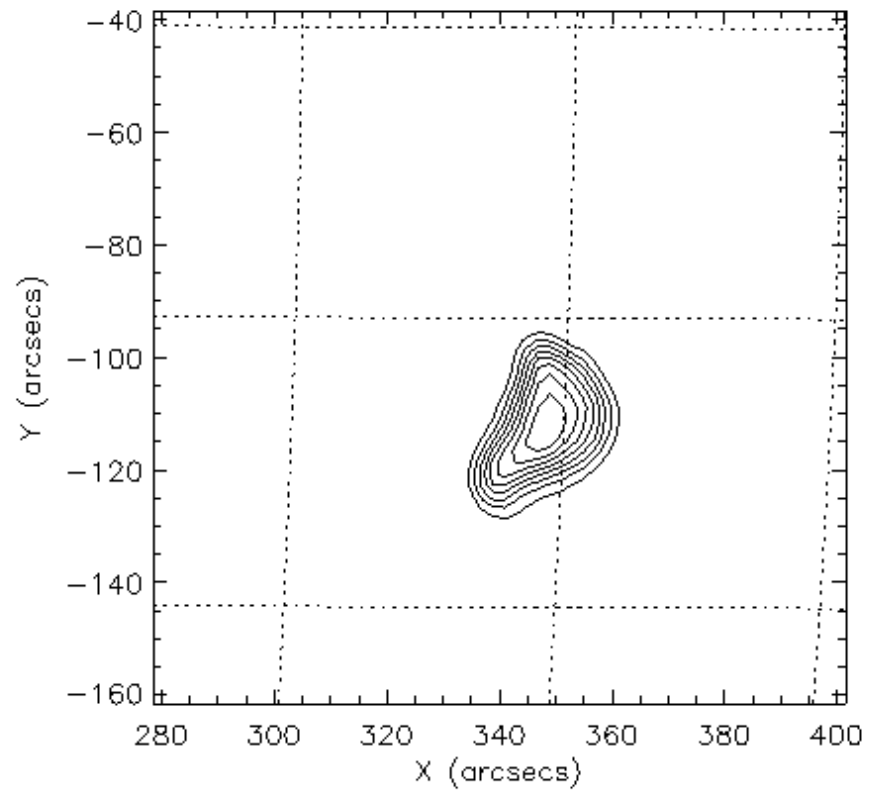
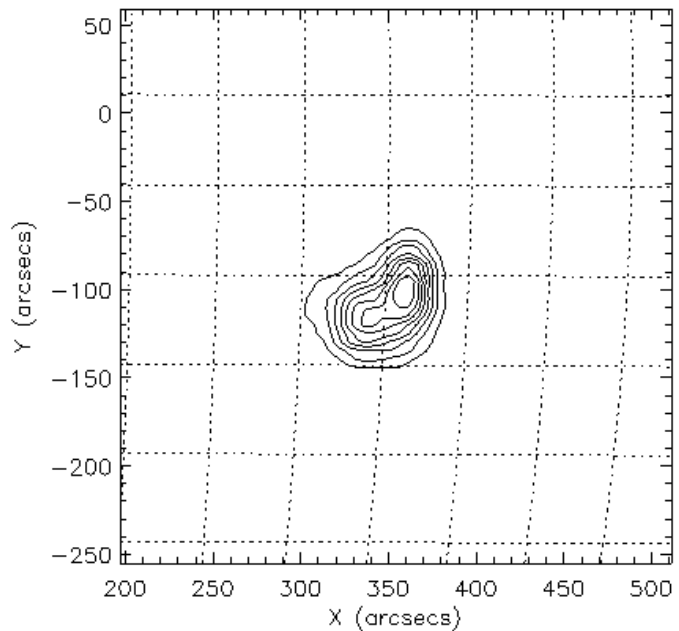
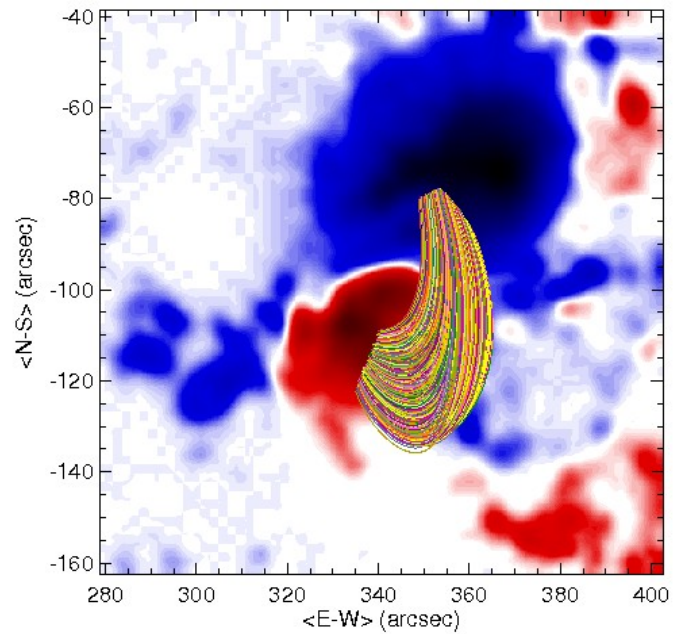
- $\alpha = 0$ (campo potencial)
- $\alpha = \text{constante}$ (campo linear)

Campo magnético sobre NOAA 10930

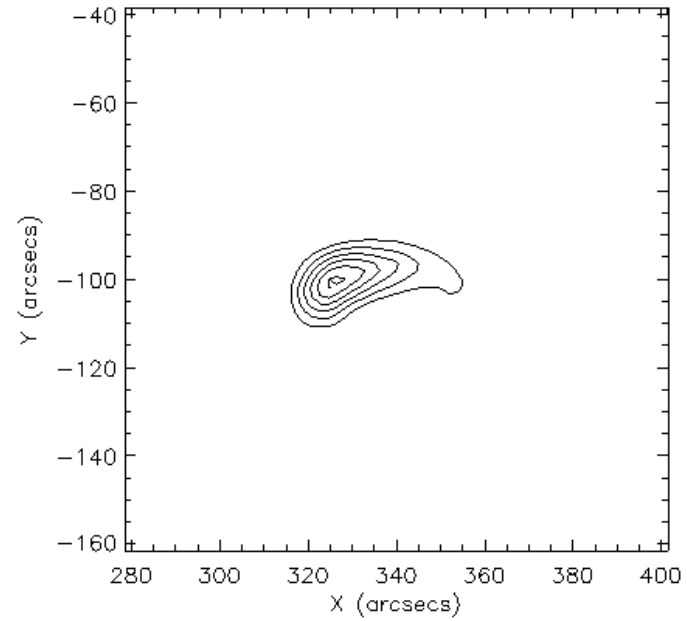
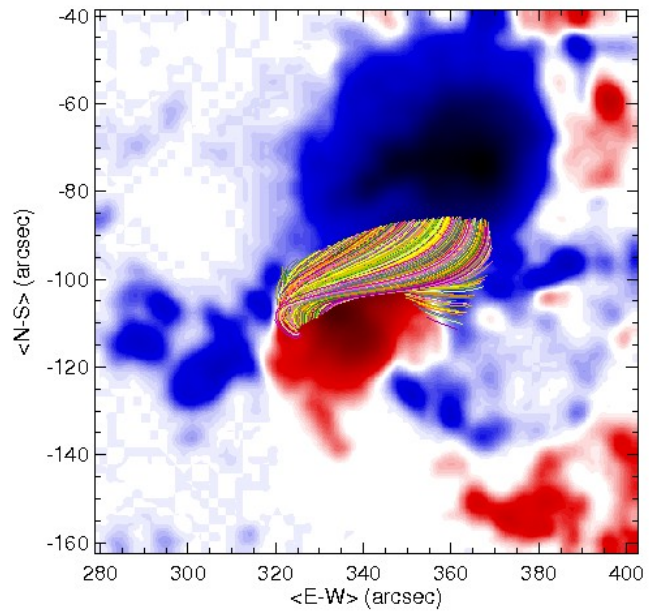
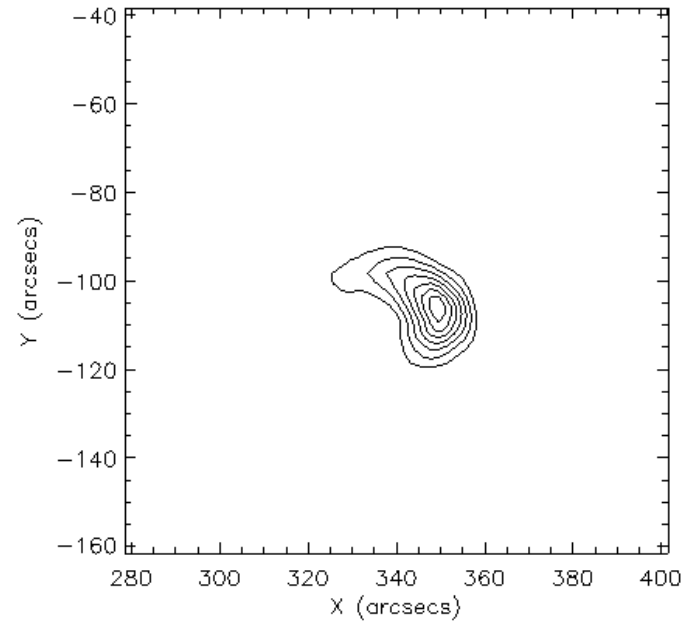
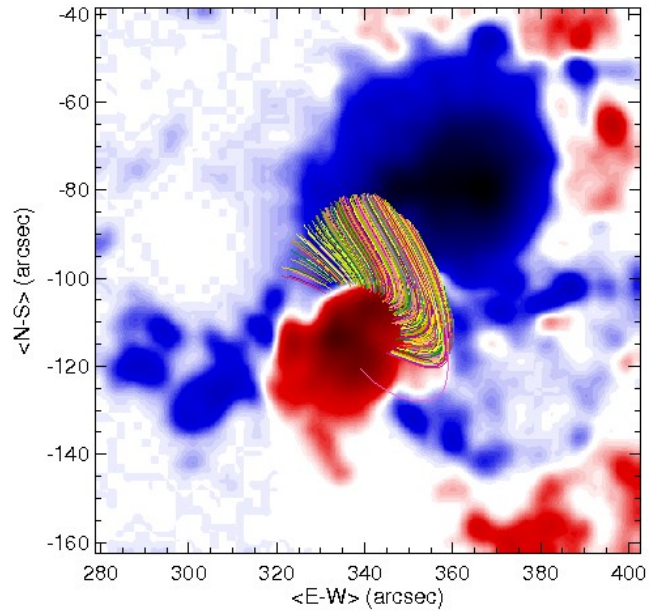




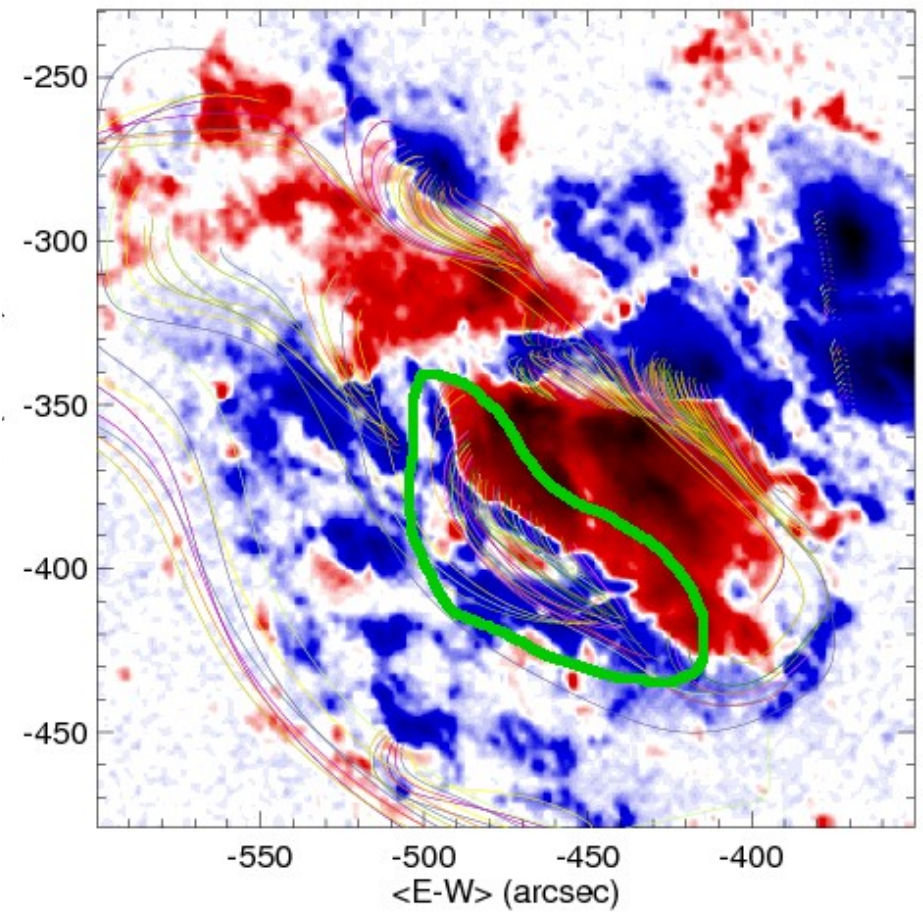
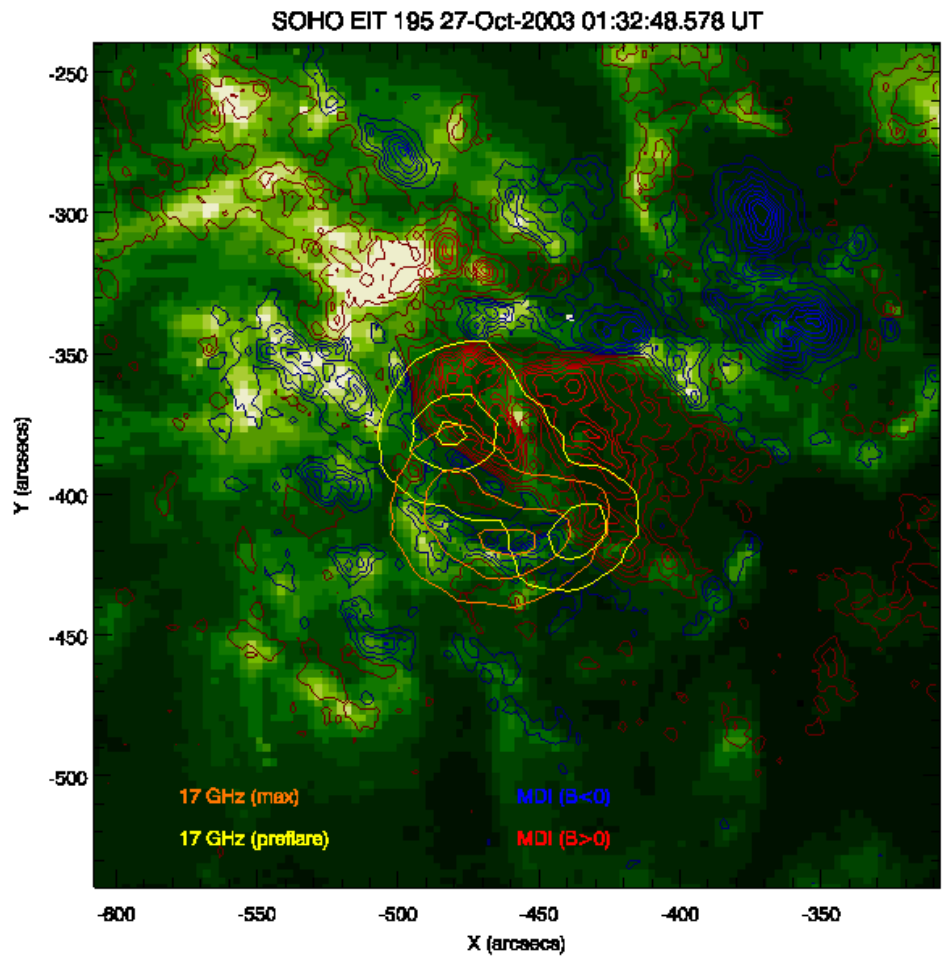
Produto final: mapa de brilho (17 GHz)



Diferentes α



NOAA 10486



Dificuldades e perspectivas

Incertezas sobre:

- Quais linhas formam a garrafa magnética
- O valor de α (parâmetro livre)
- Perfil de distribuição de elétrons injetados

Aplicação de método de otimização para testar várias combinações

Obrigada!