Summary of the

Solar/Astron Session

P. F. Chen

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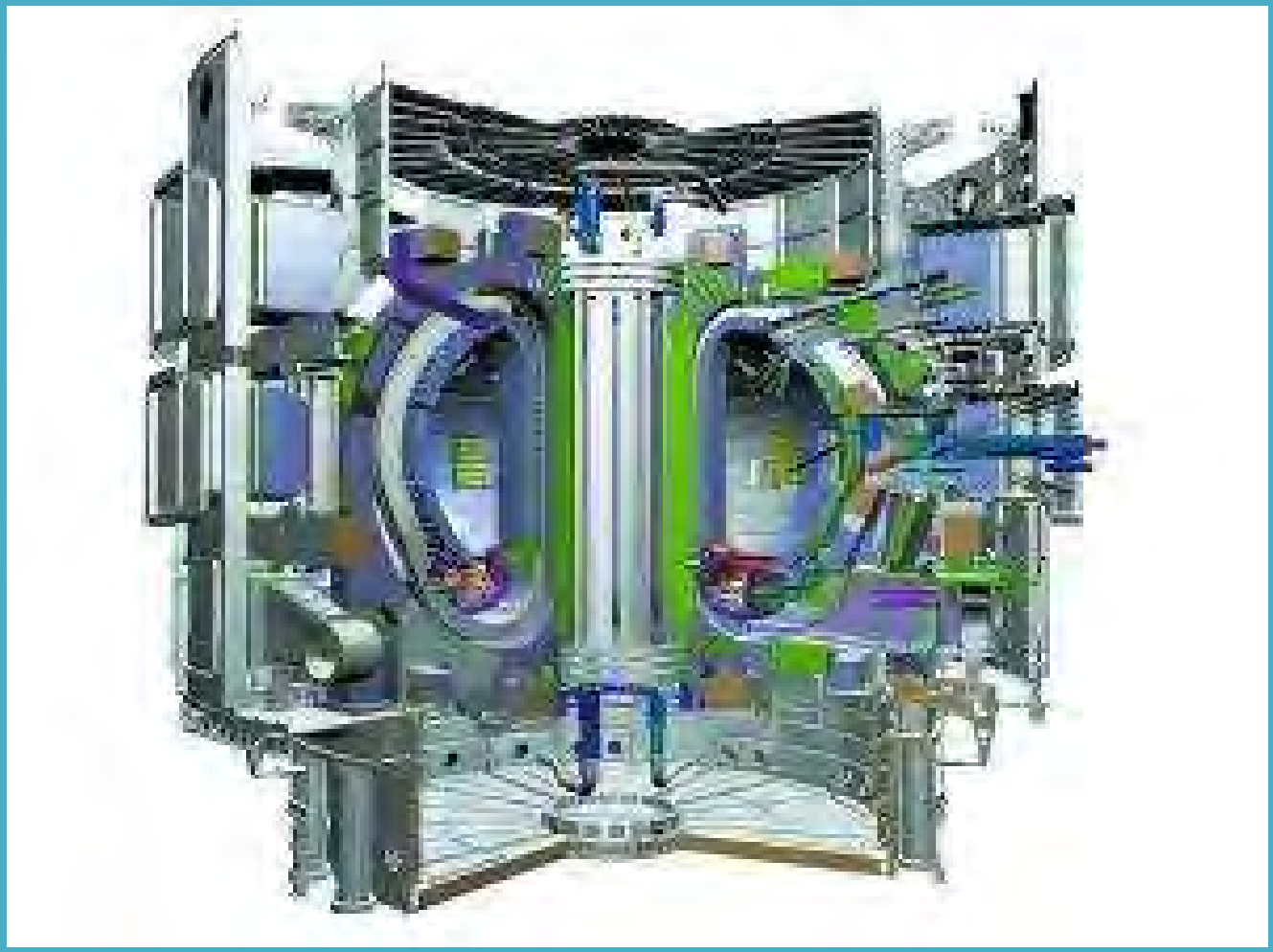
NANJING UNIVERSITY

Charm of *Chengdu*

Once being here,

you would rather live here,

not to leave here.

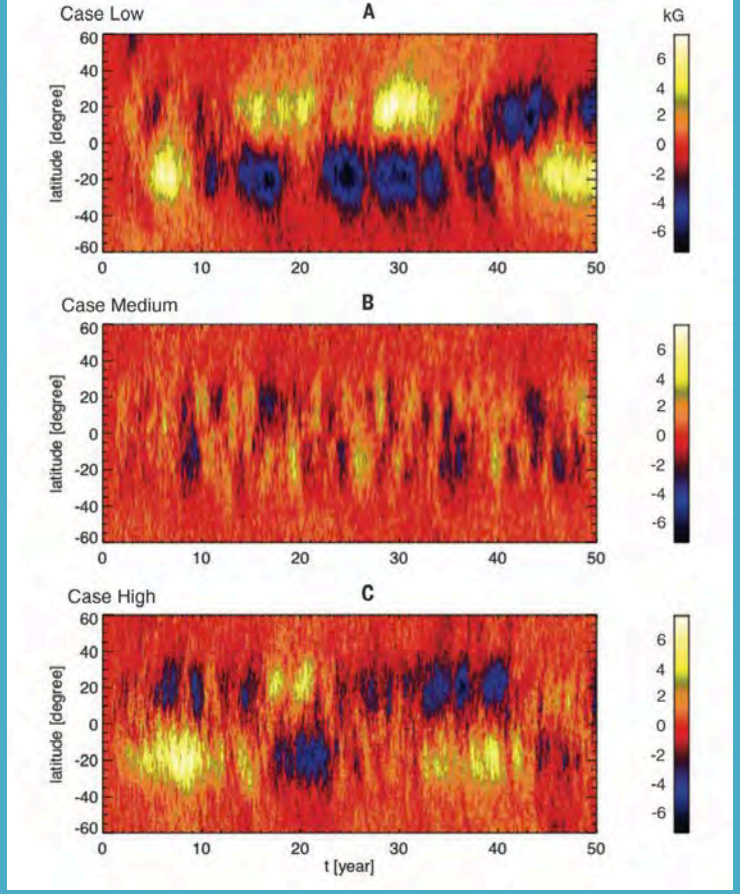


Solar/Astron guys love instabilities!

Dynamo, Helicity & Filaments

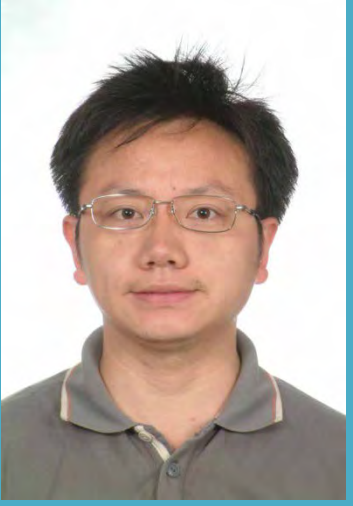
M. Zhang

J. Z. Zhu



Hotta + (2016)

$$\alpha = \frac{\tau_c}{3}\left(-\overline{\boldsymbol{\omega}\cdot\boldsymbol{u}} + \frac{\overline{\boldsymbol{j}\cdot\boldsymbol{b}}}{\overline{\rho}}\right)$$

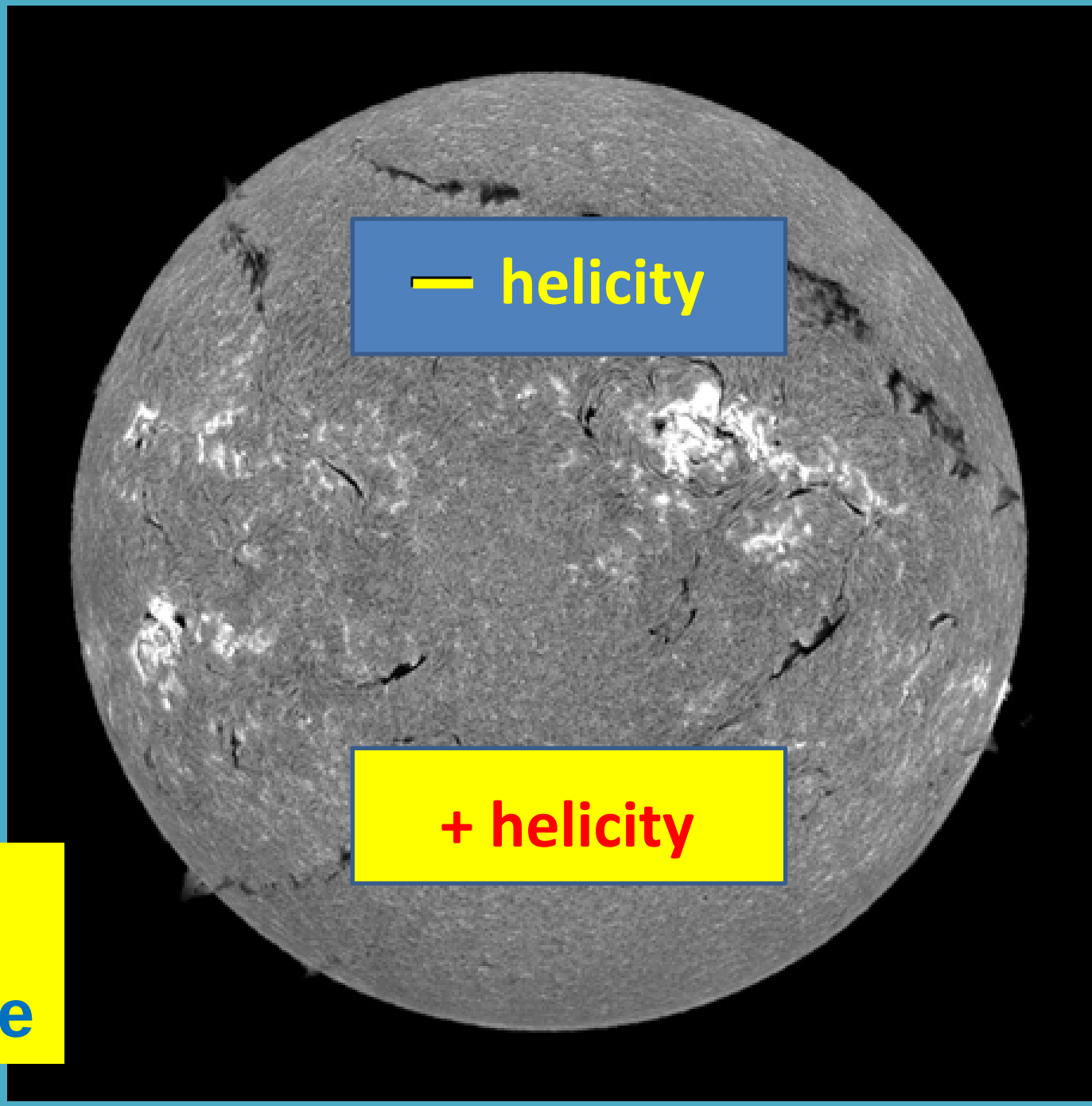


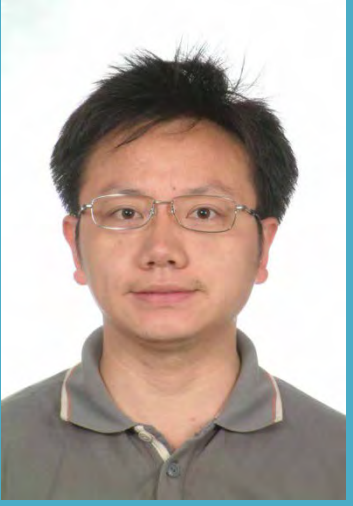
P. F. Chen

$$H_c = \mathrm{J} \bullet \mathrm{B}$$

91.6%

follow the rule

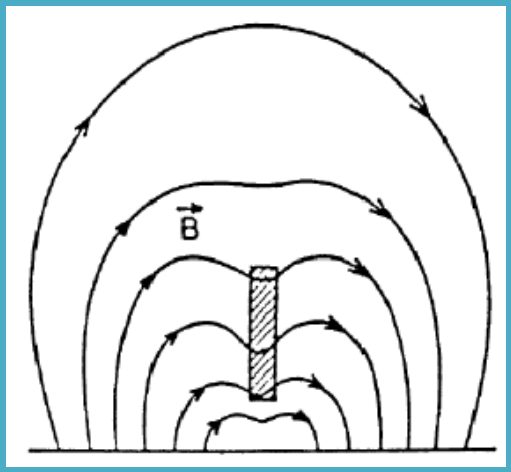




P. F. Chen

Flux rope

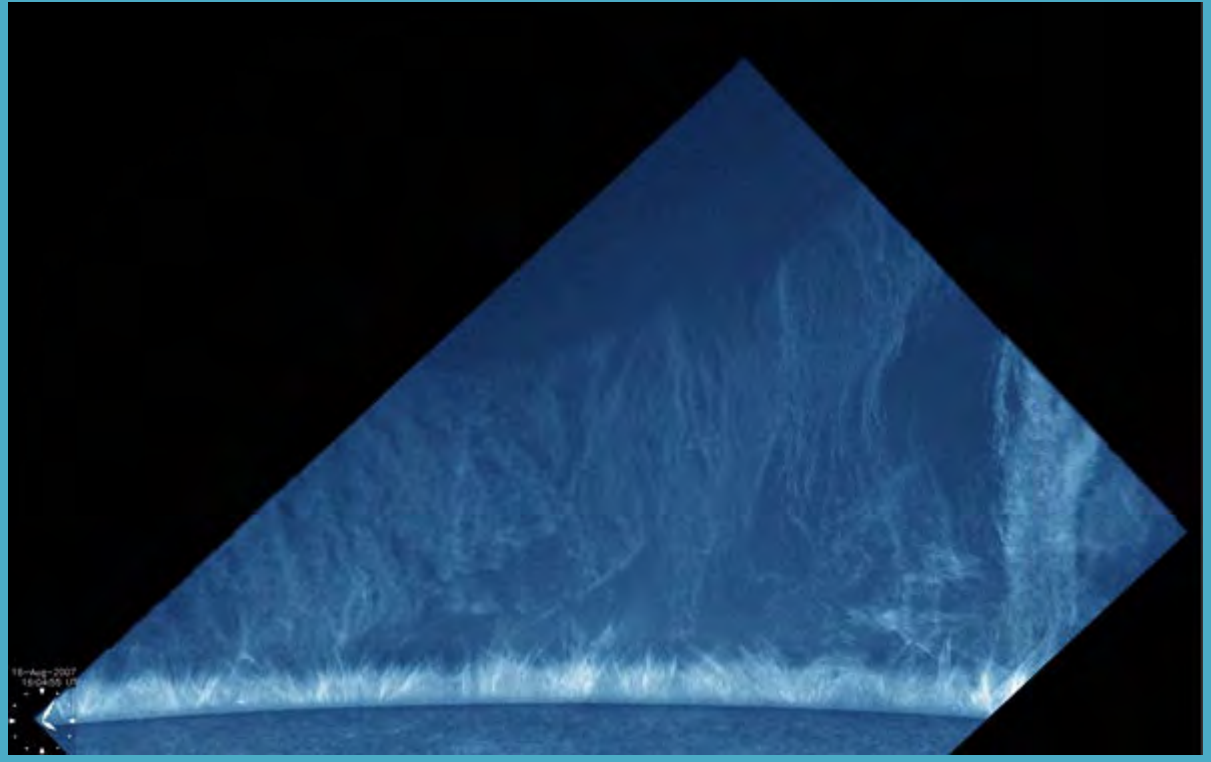
89%



Sheared arcade

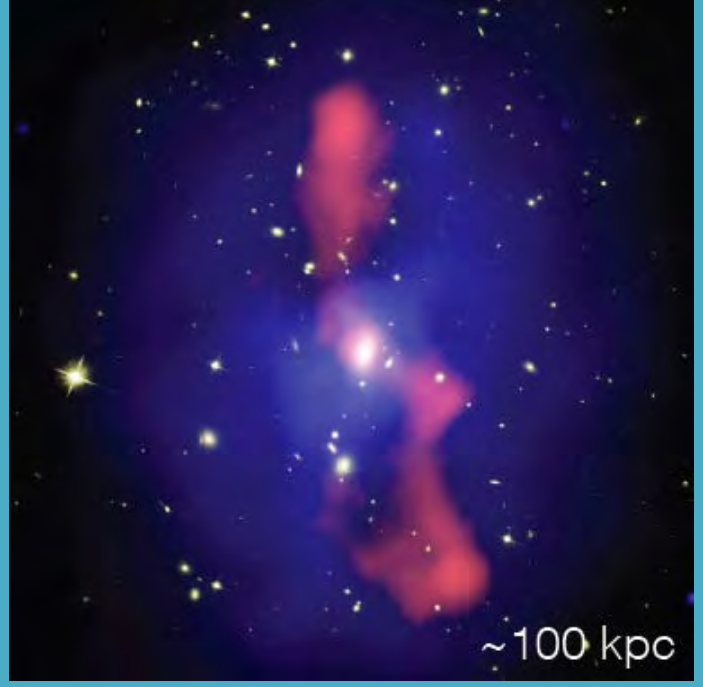
11%

A. Hillier



Magnetic Rayleigh-Taylor instability

P. Sharmar

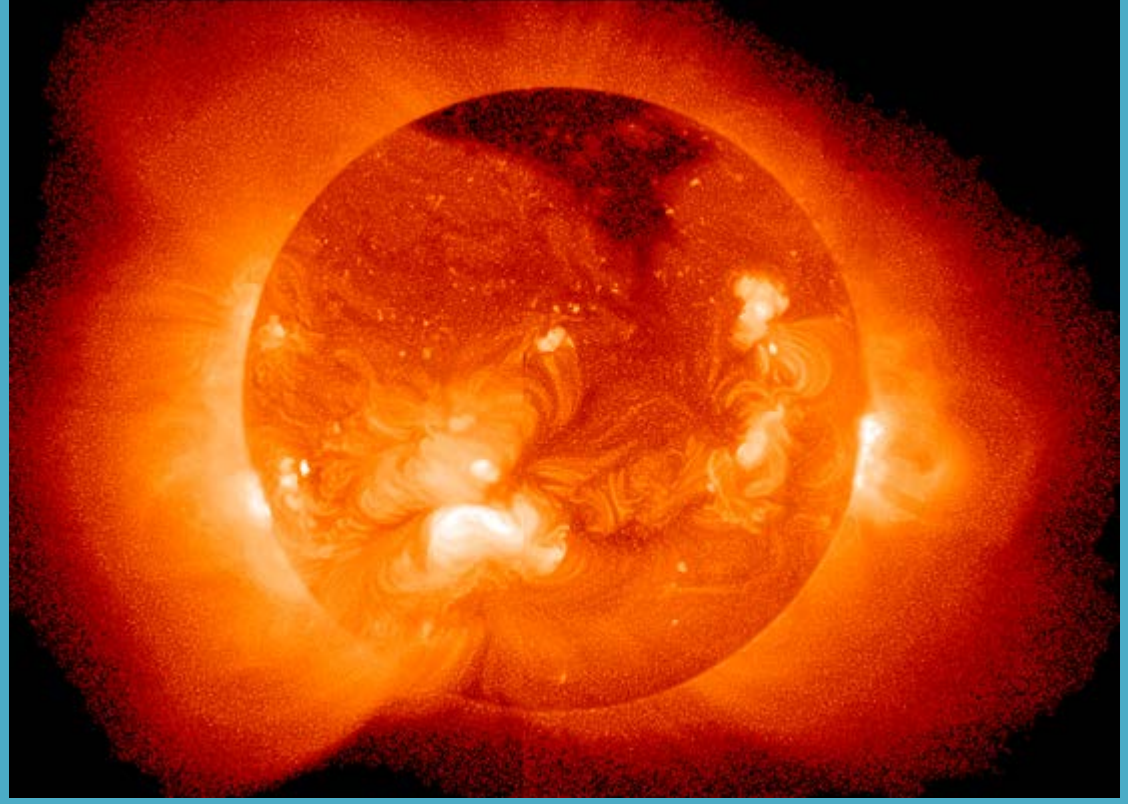


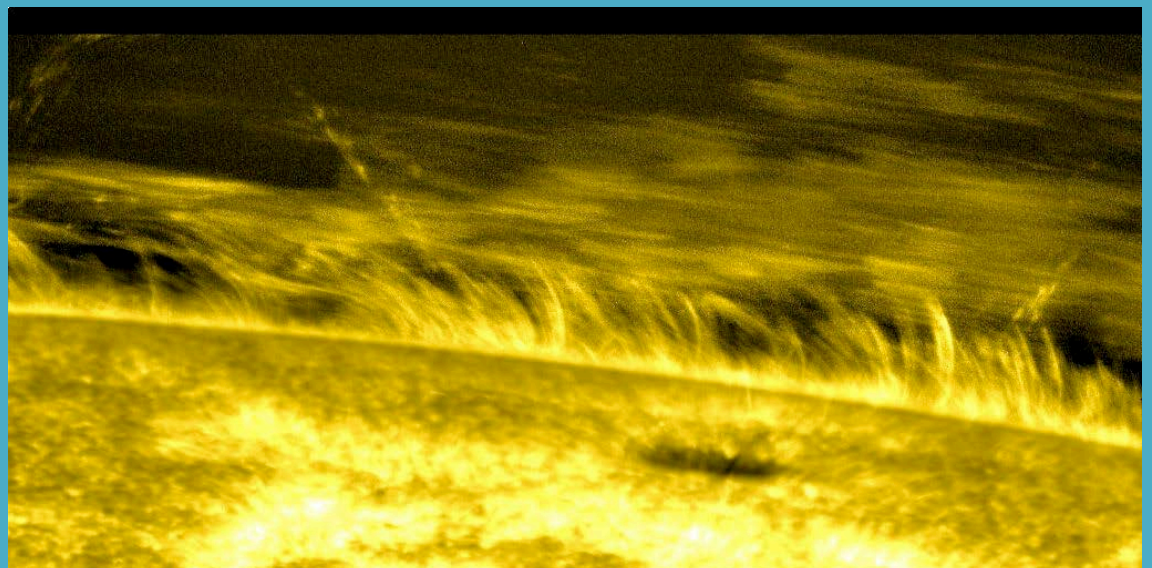
Mass supply cycle:

Black hole ➡ Corona ➡ Cool filaments

Coronal Heating

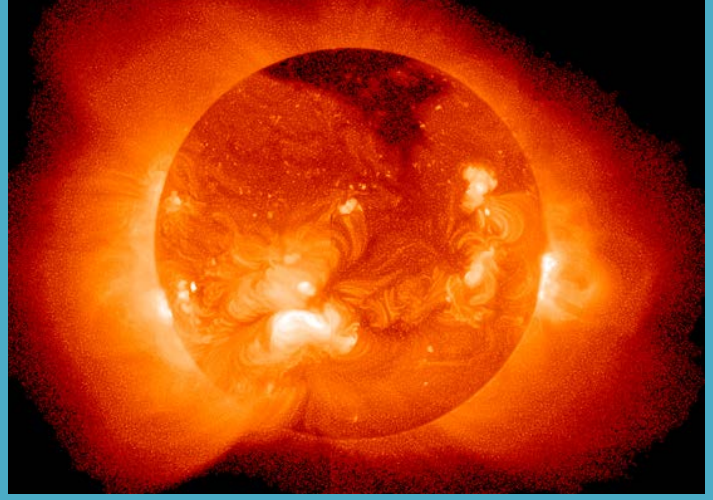
J. Okamoto





Alfven waves

Ling Chen

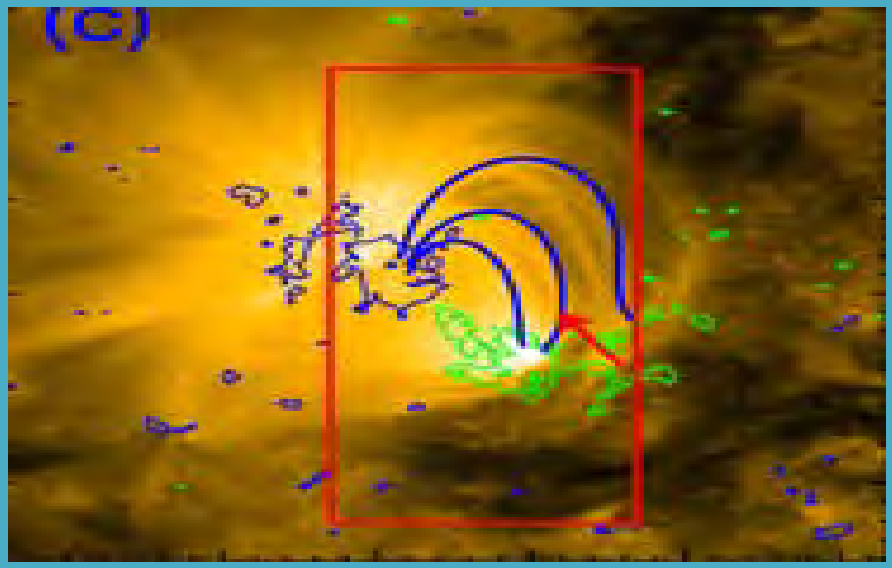


Kinetic Alfven waves via Landau damping

L. Xiang

Ion beams are more effective than electron beams in exciting Alfven cyclotron waves.

H. X. Xie



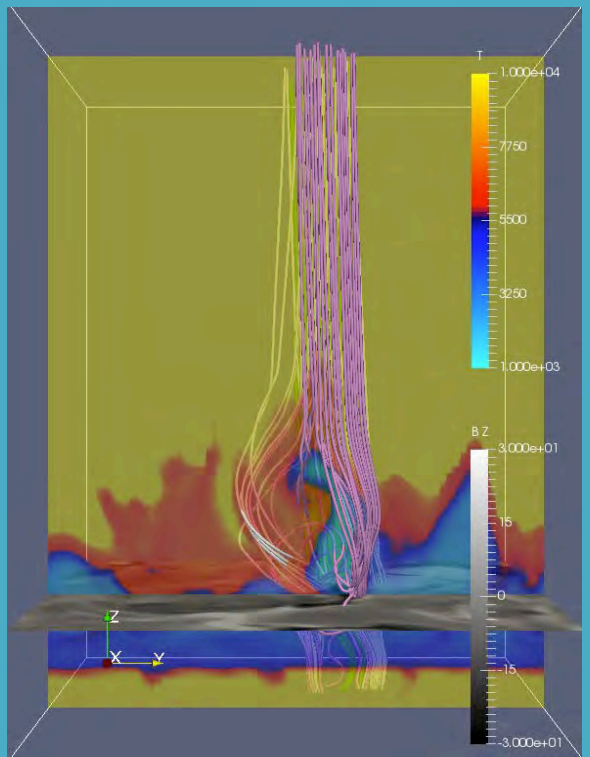
Most loops are not in a hydrostatic state

T is nearly uniform along the loops.

Solar chromospheric jets

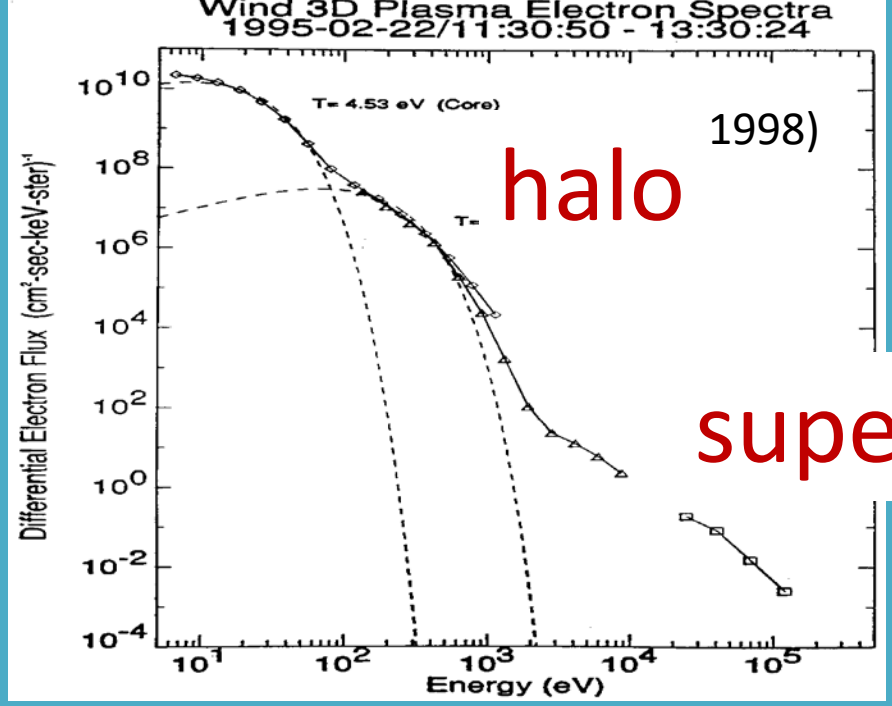
T. Yokoyama

3D MHD



Solar Wind

L. H. Wang



1998)

halo

superhalo

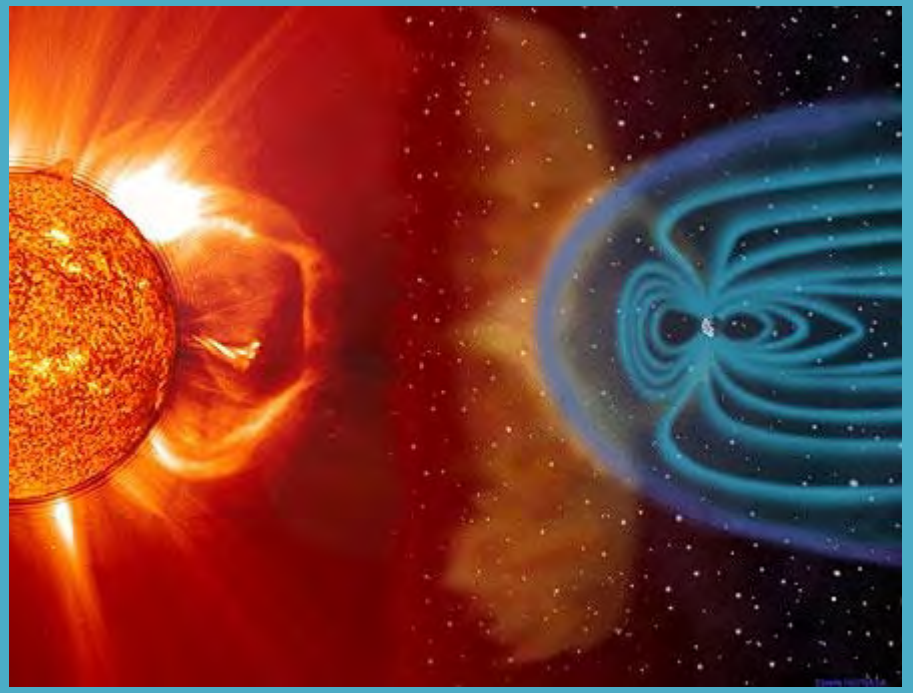
A power-law spectrum, $J \sim E^{-\beta}$, with $\beta \sim 2.4$.

Nearly isotropic angular distributions.

No clear correlation with solar flares or CMEs.

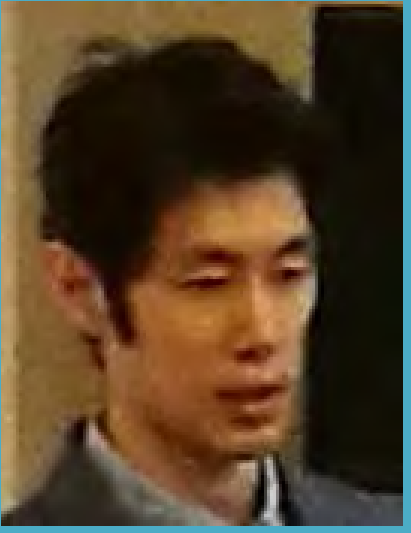
Different origins

J. Seough

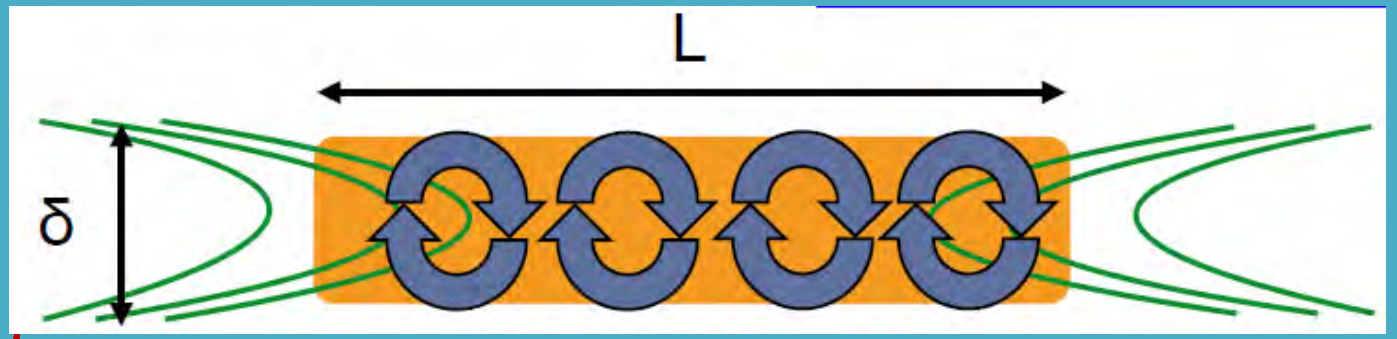


Whistler waves can be generated by electrons.

Relativistic MHD

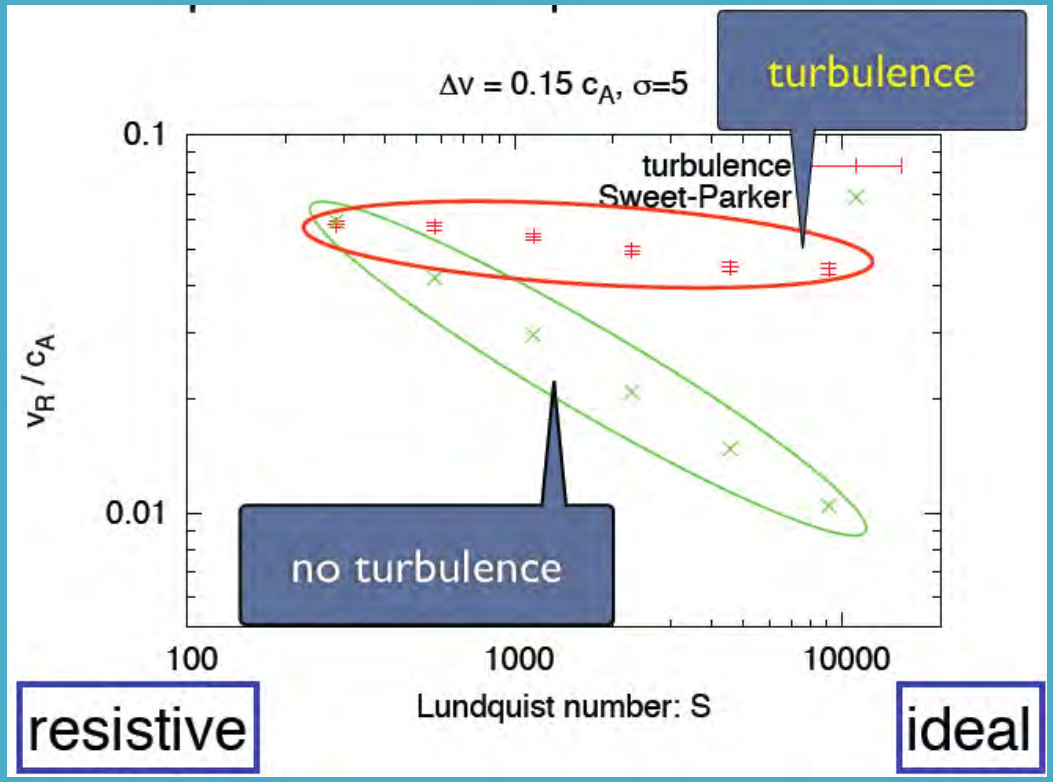


Relativistic reconnection in Poynting-dominated plasma



M. Takamoto

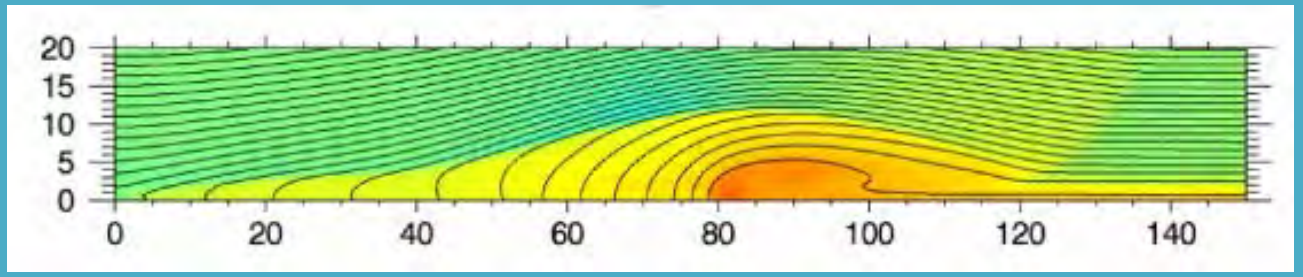
Only 1% of B energy is sufficient to drive turbulent reconnection



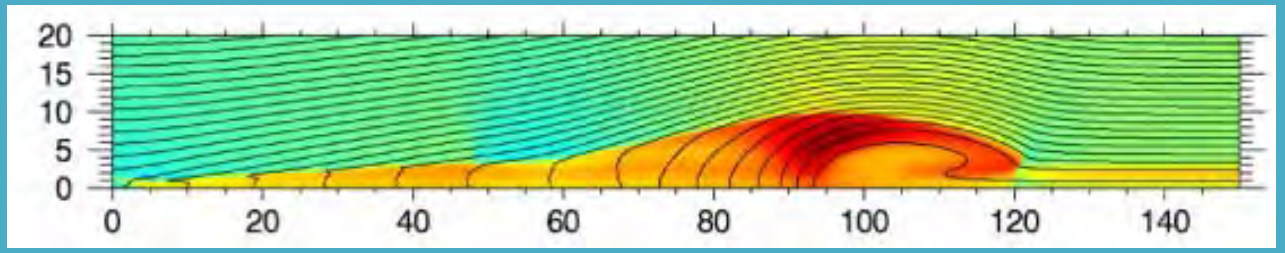
Radiative relativistic reconnection

T. Takeshige

without radiation



With radiation

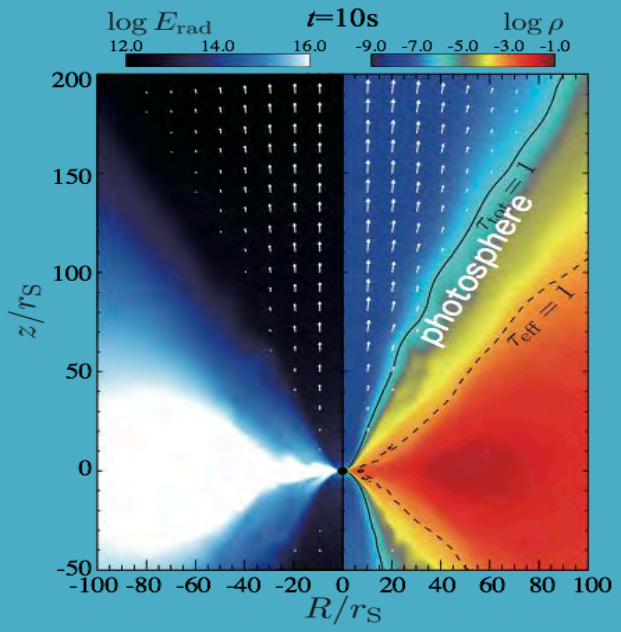


Radiation can increase reconnection rate.

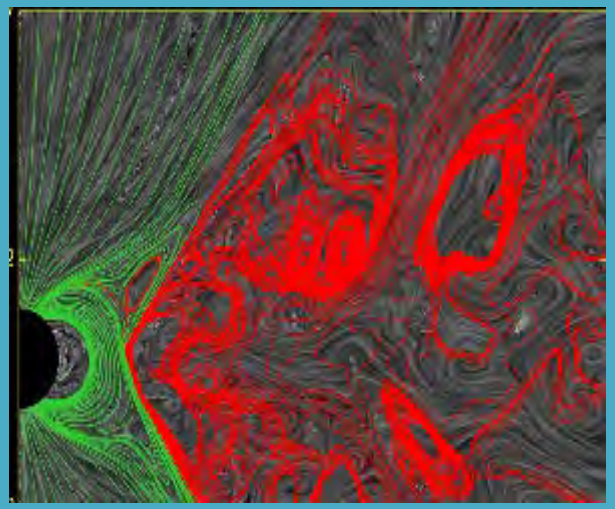
Radiative MHD with GR

H. Takahashi

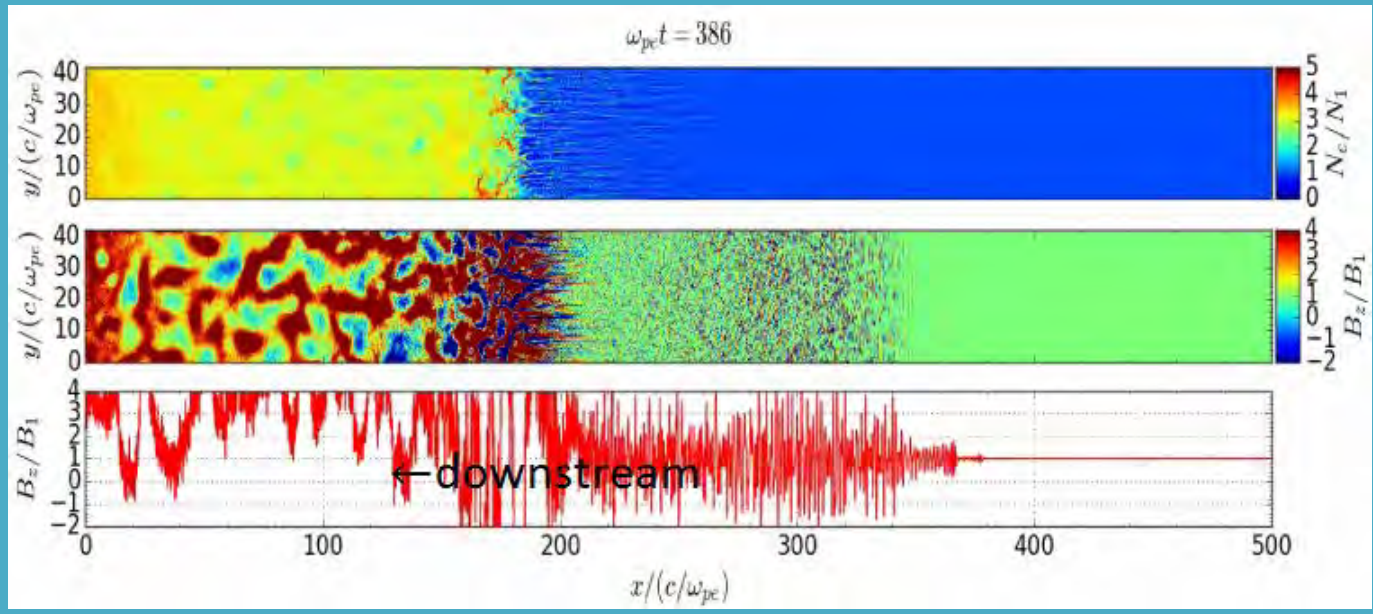
Black hole



Neutron star



Radiation can accelerate high-speed jets



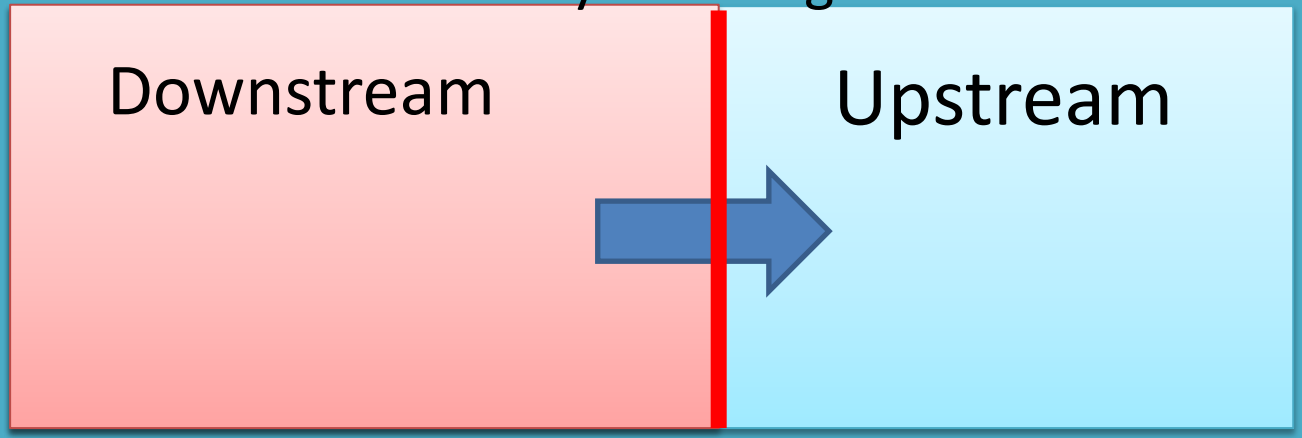
M. Iwamoto

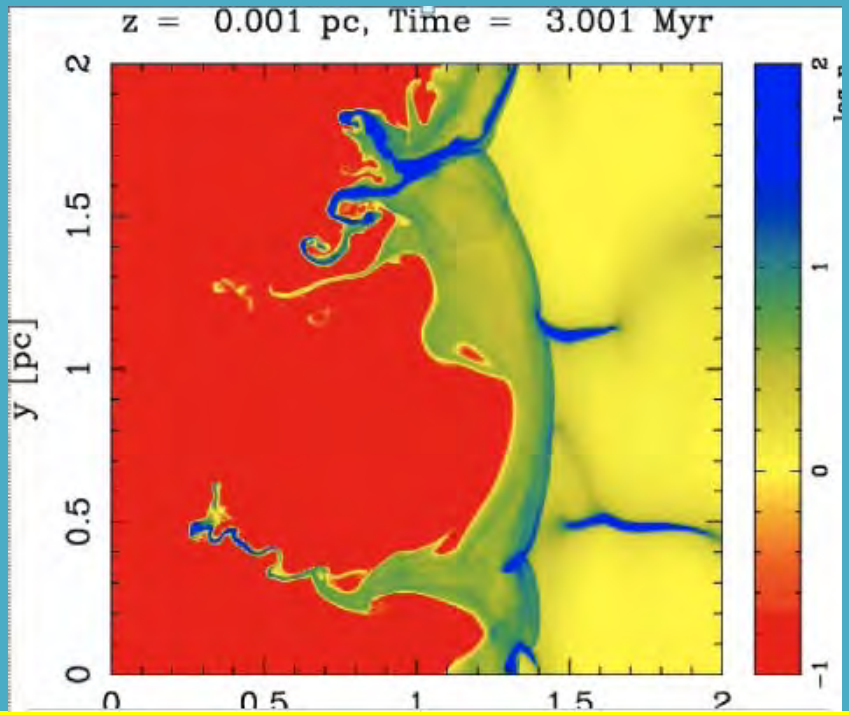
PIC simulations

Strong electromangetic wave emissions are generated at the upstream of relativistic shocks

T. Inoue

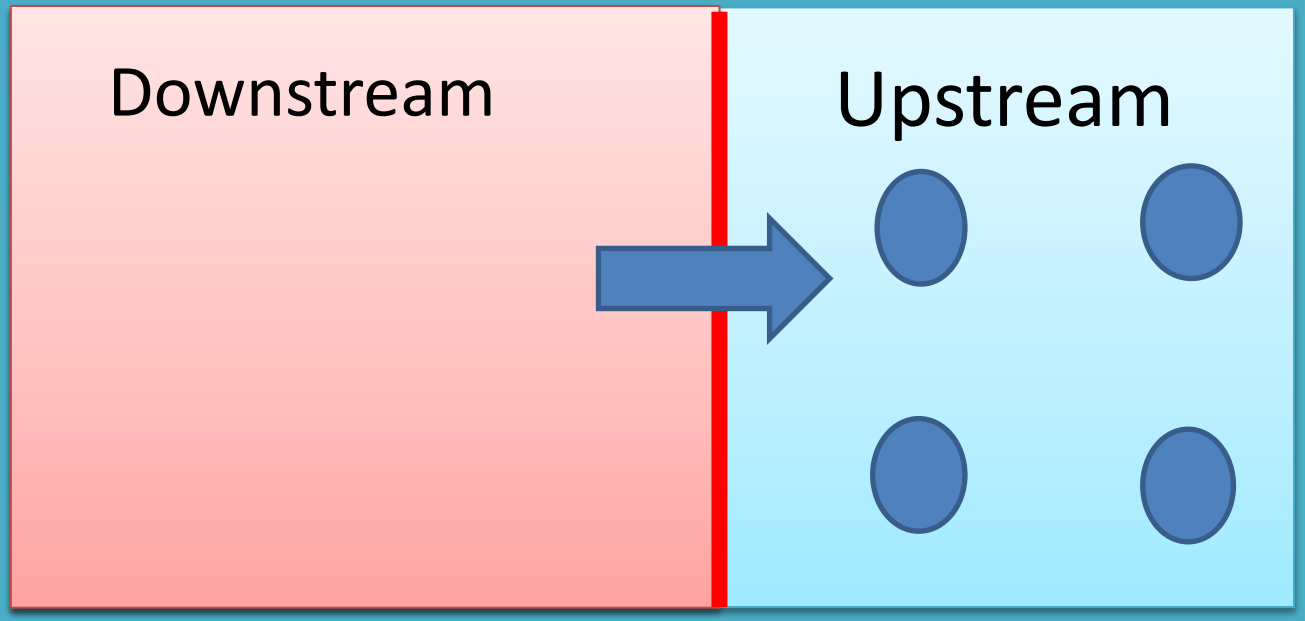
Uniformity is boring.





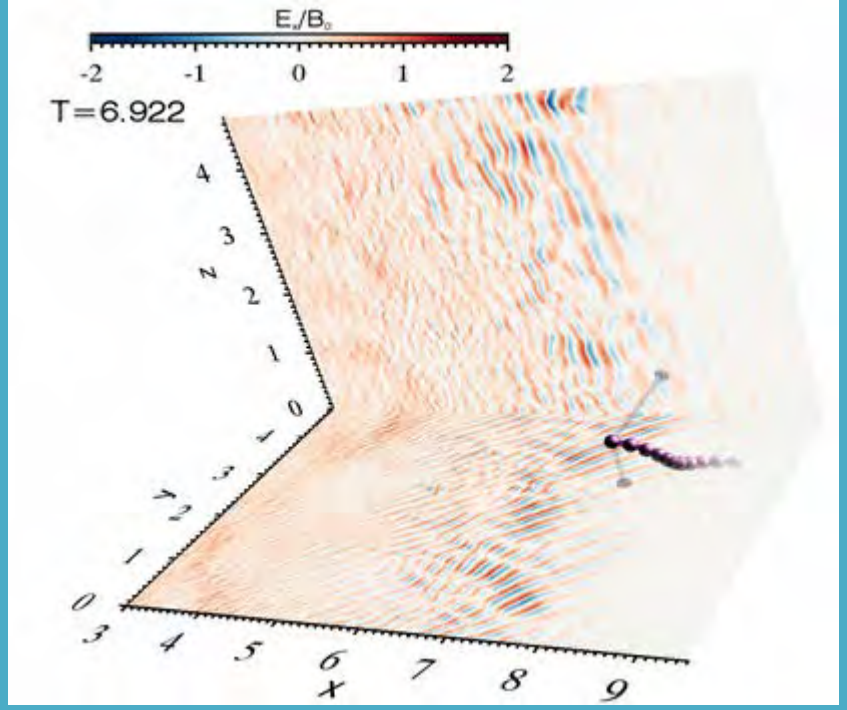
Clumps help accelerate particles

S. Tomita



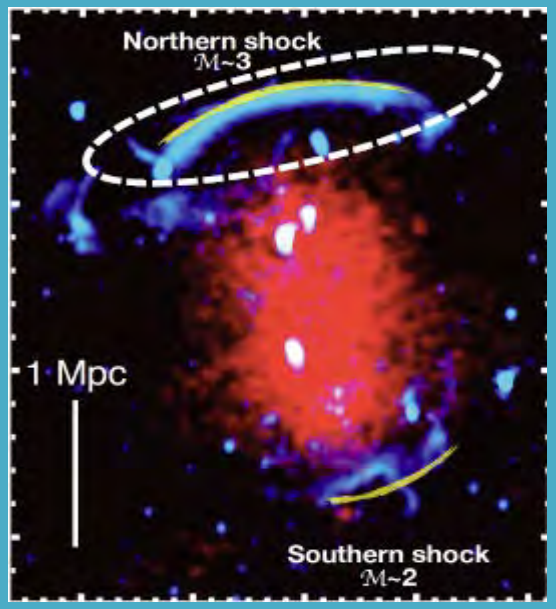
Non-uniform upstream can extend the lifetime of the enhanced B in the downstream.

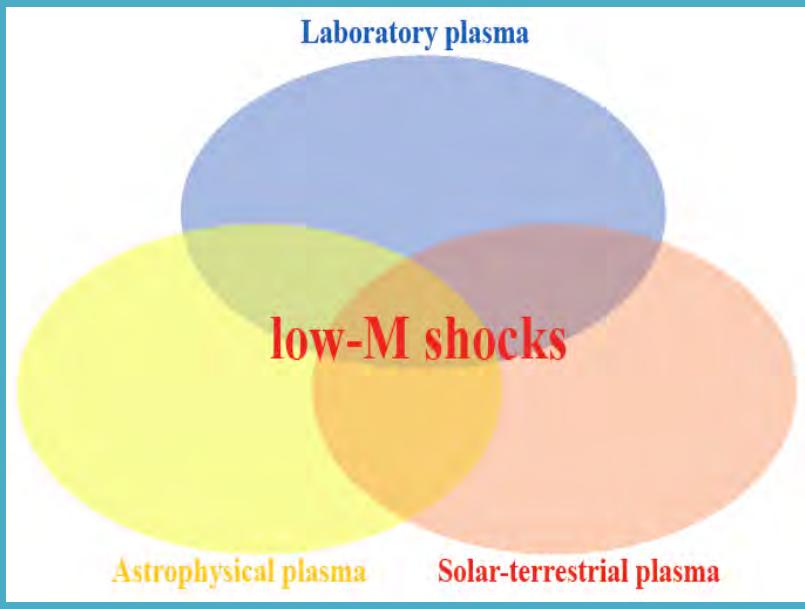
Y. Matsumoto



The 1st 3D PIC simulations of high-M_A shock

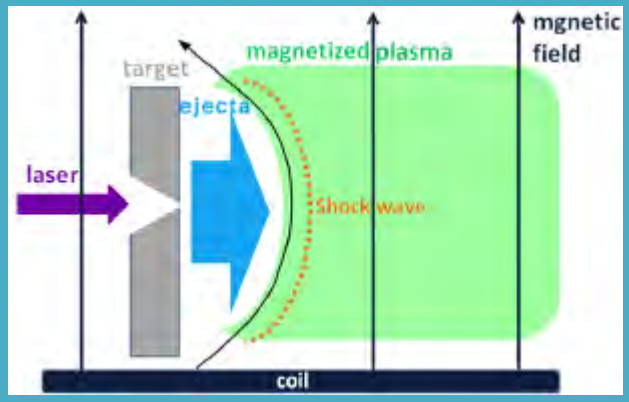
Electron shock surfing & drift accelerations under turbulence generate relativistic particles



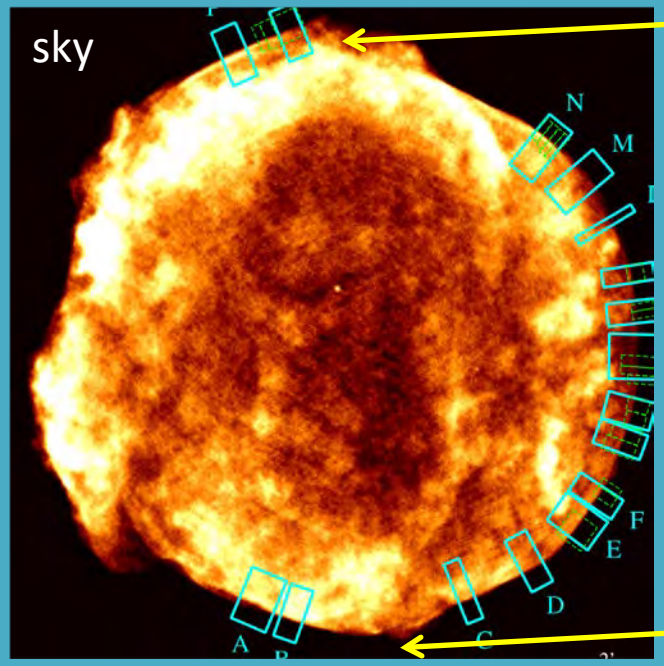


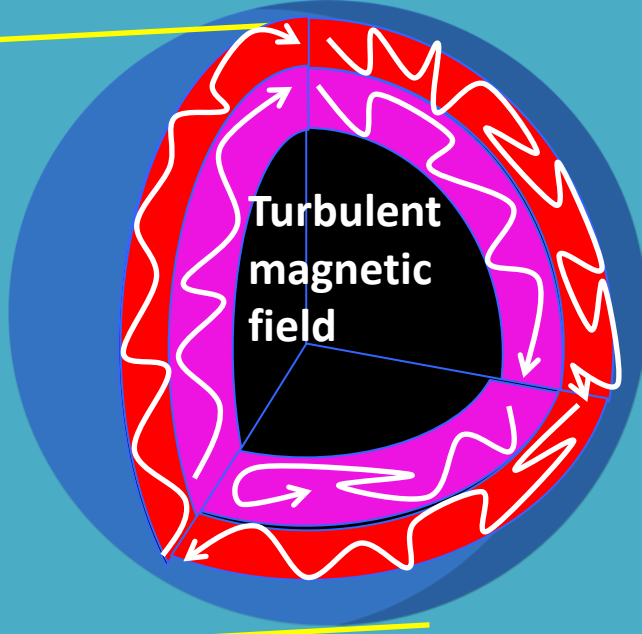
R. Yamazaki

PIC simulations +



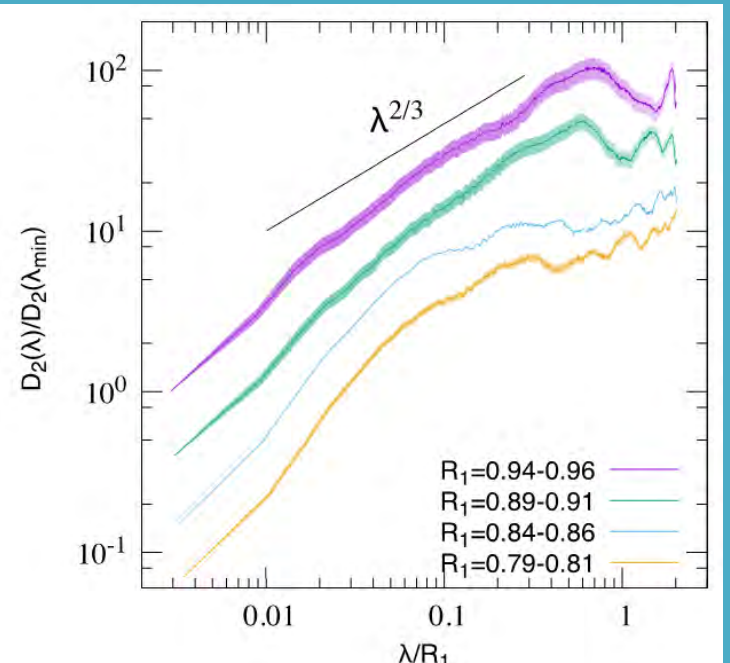
Advantage: simultaneous measurements of density and T across the shock, Ma>3





J. Shimoda

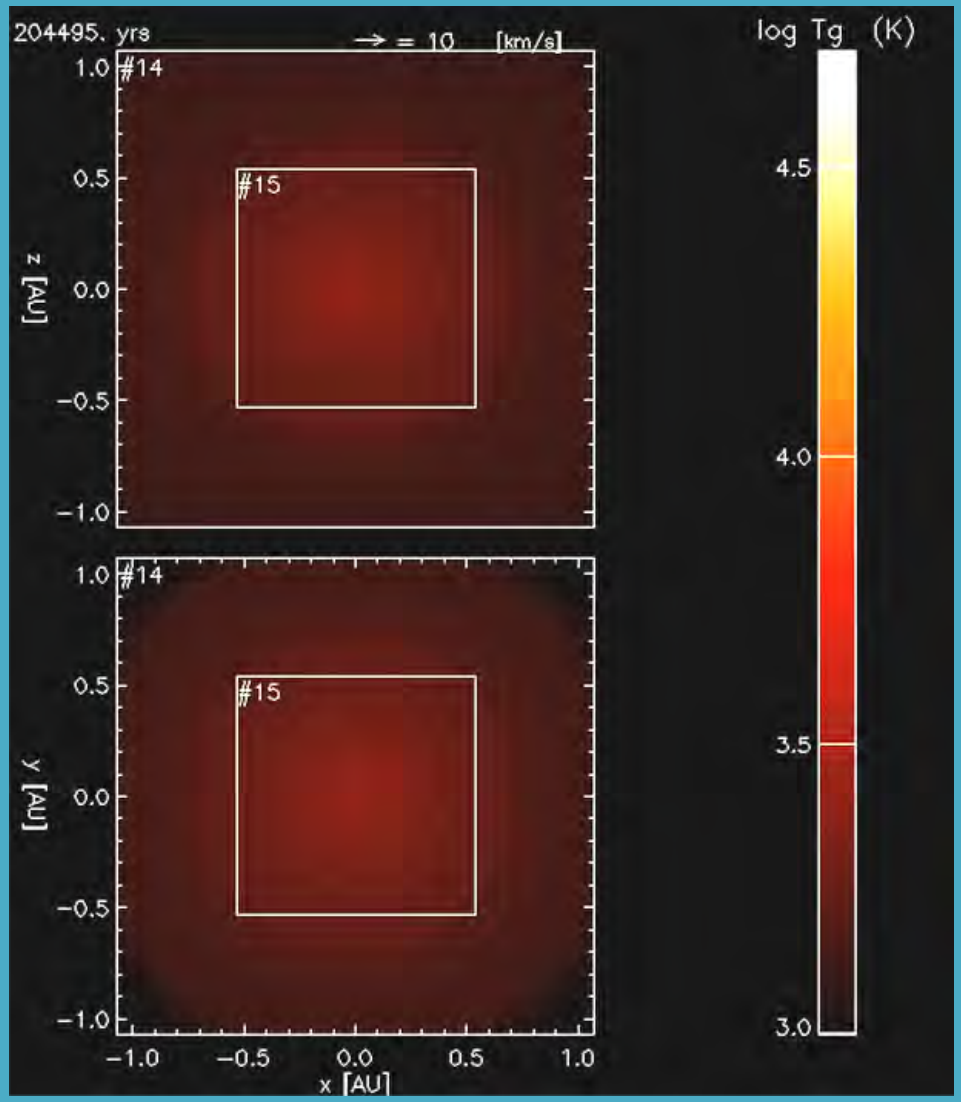
B→shock→particle→radio emission



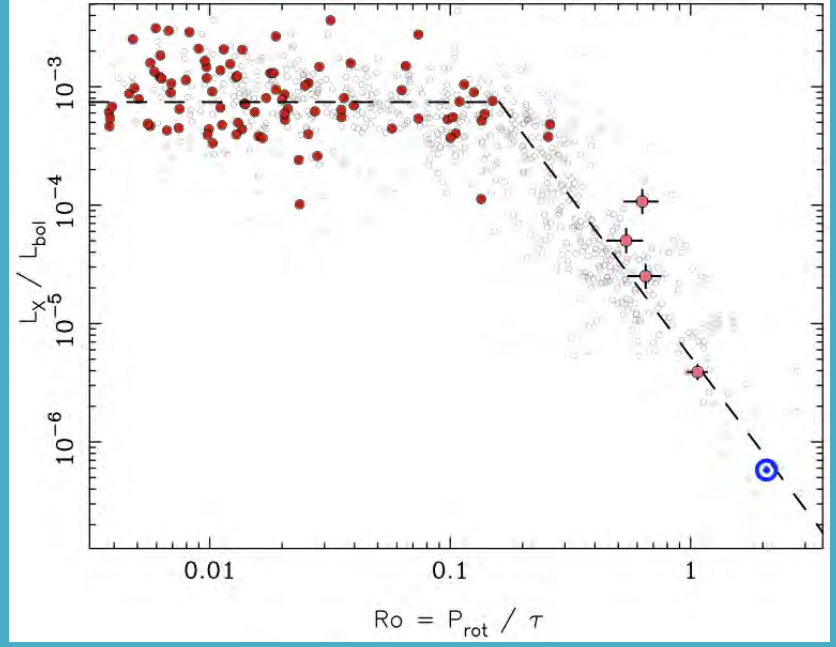
Komolgorov-law only at the outer shell

Star Formation

K. Tomida



Sun and planets are formed together

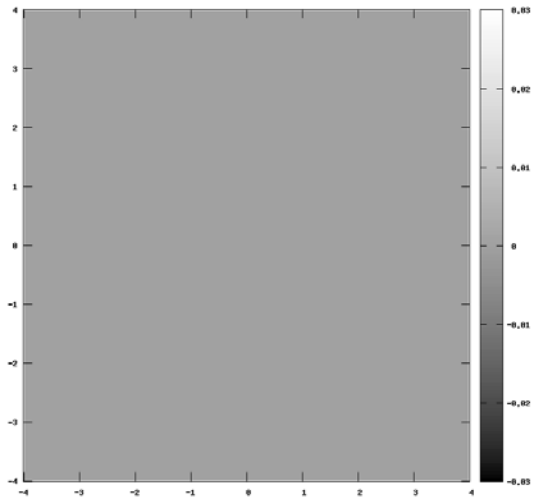


Y. Masada

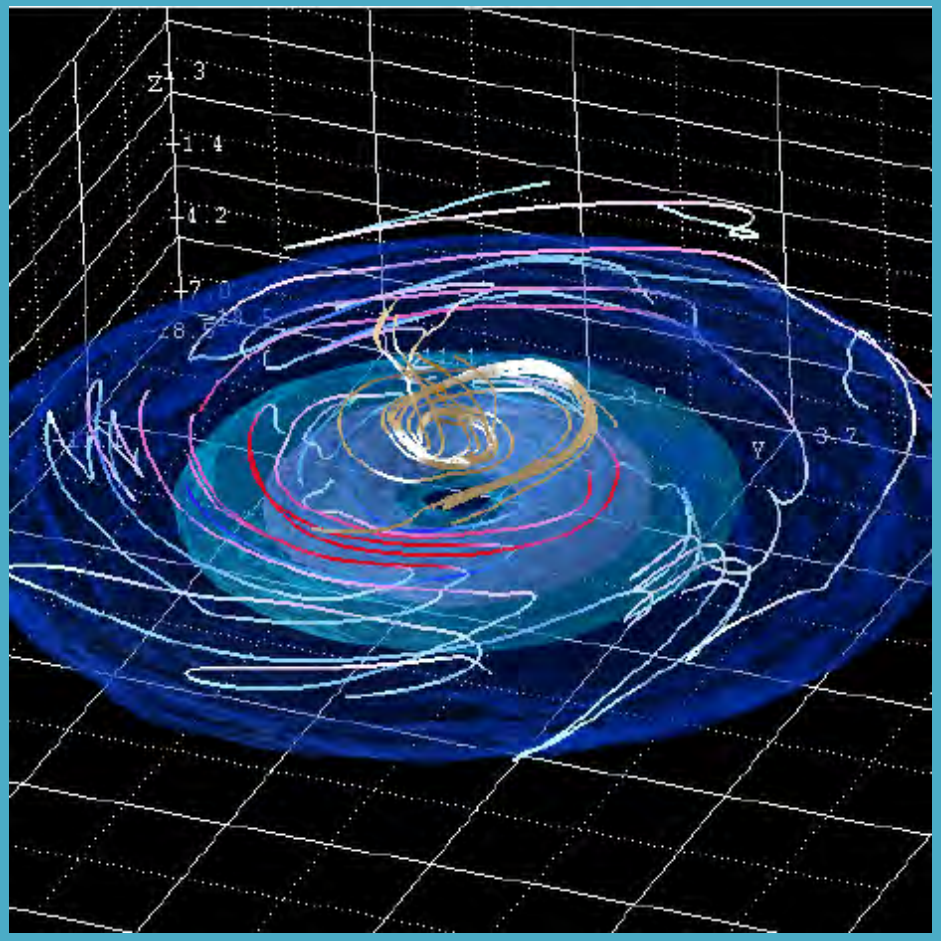
A Key Parameter : Rossby number

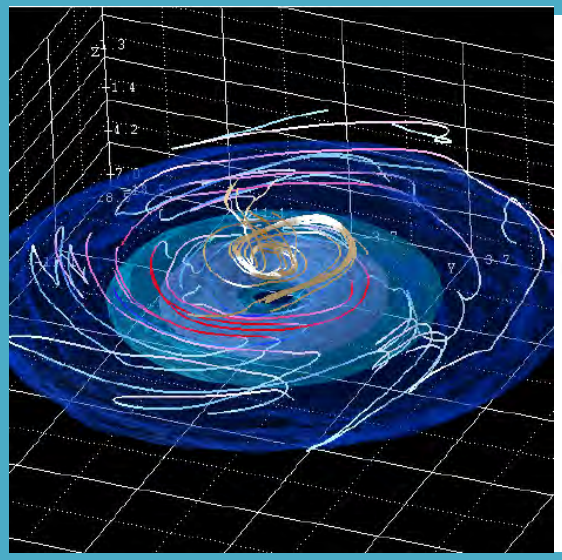
A simple MHD model to explain it

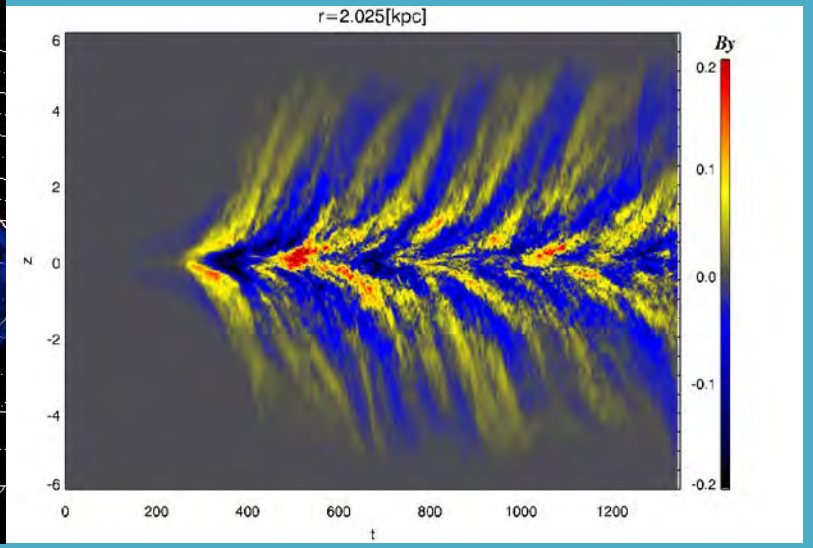
11-year solar cycle



Accretion Disk



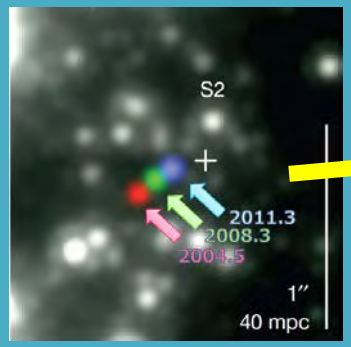


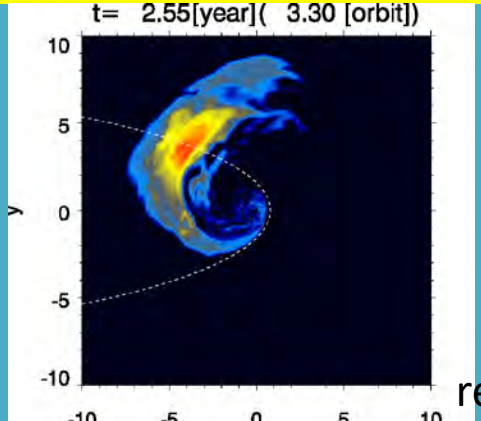


R. Matsumoto

A higher order MHD code CANS+

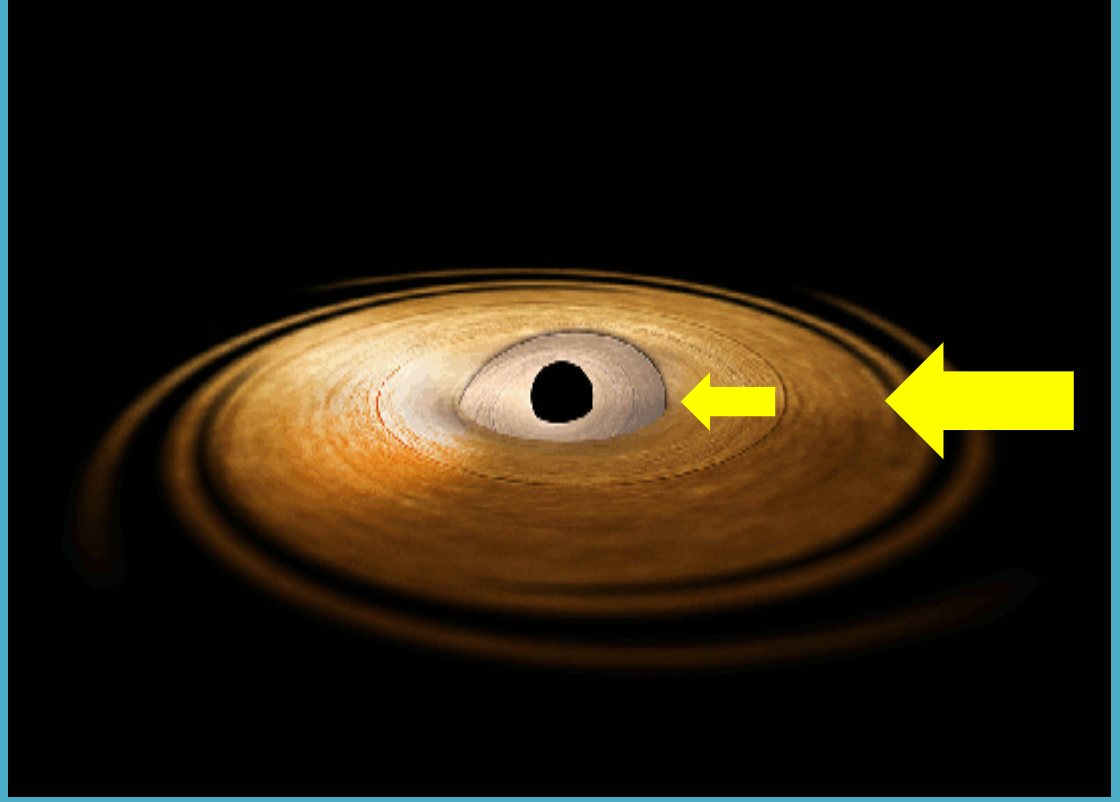
MRI + buoyant escape ➔ cycle

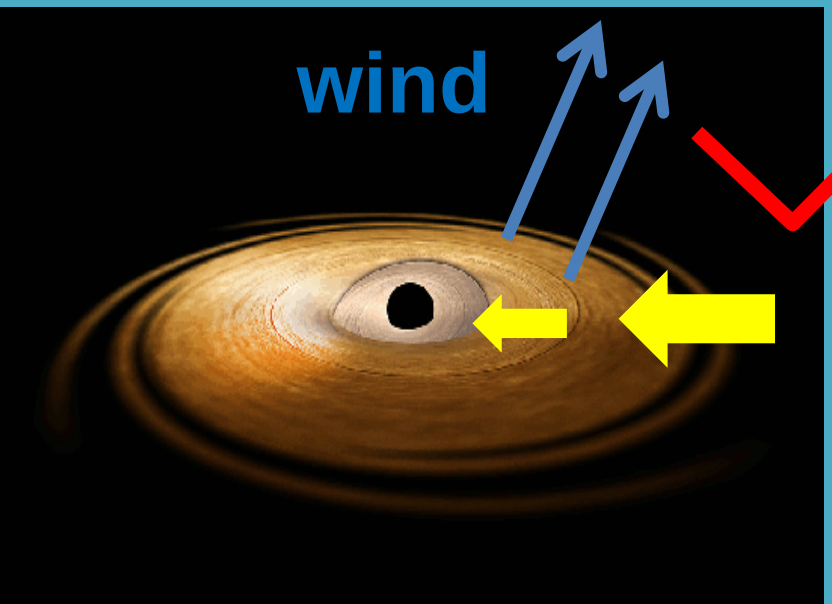


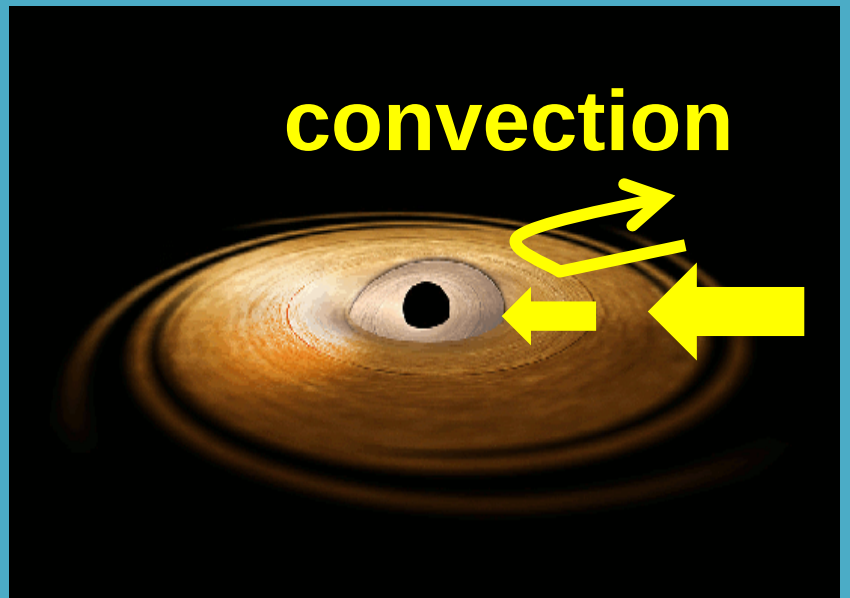


retire

D. F. Bu



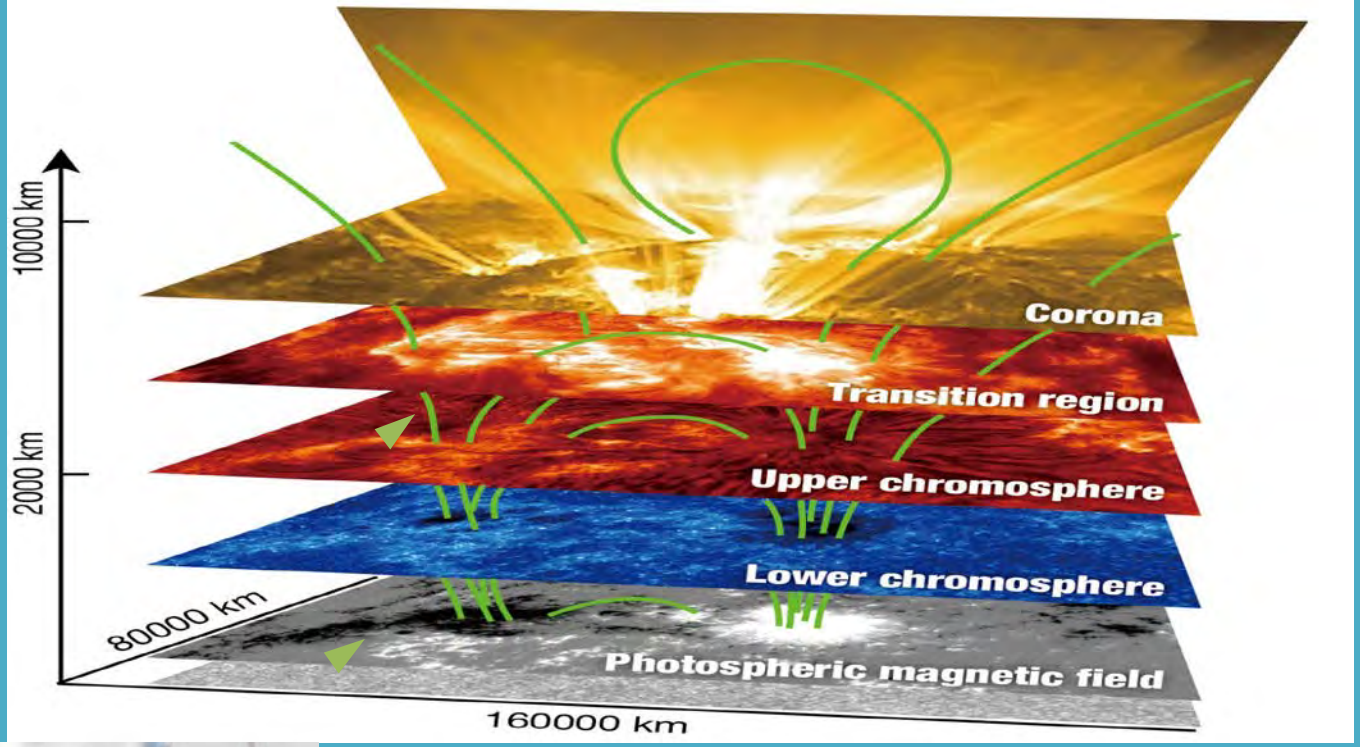


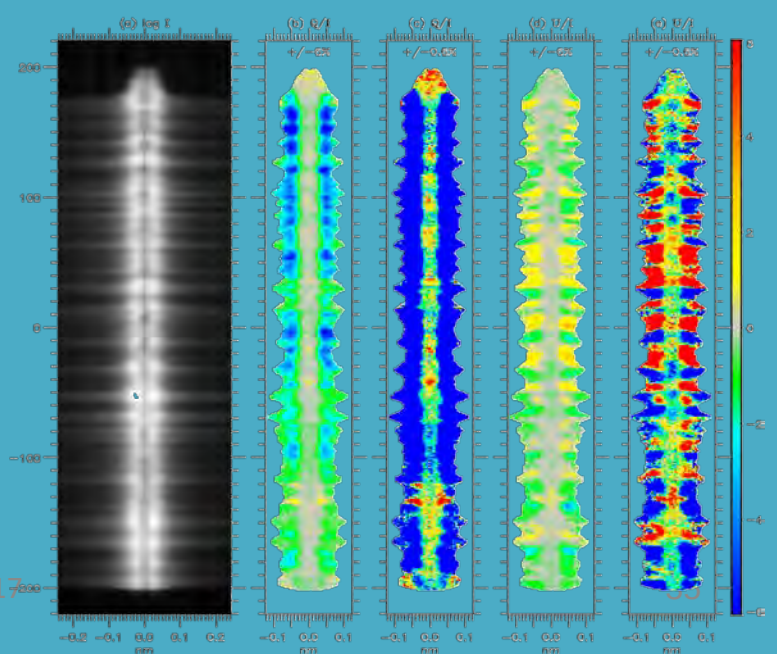


Instruments

R. Kano

CLAPS

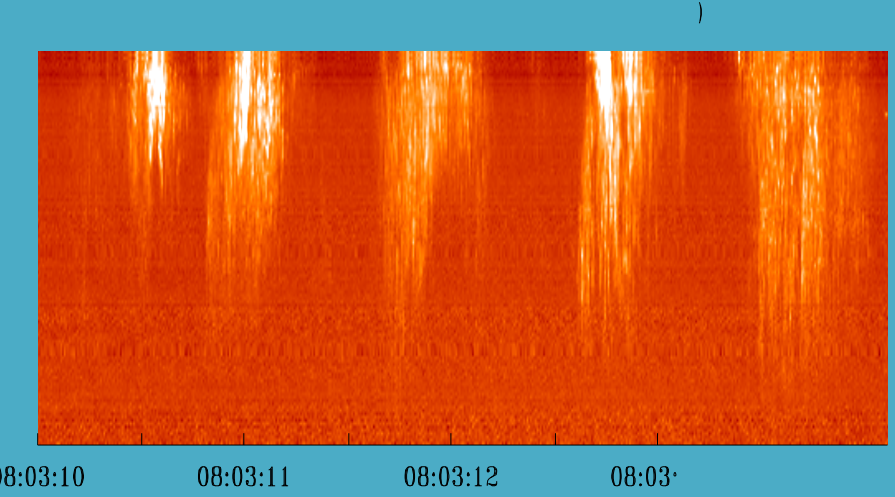

10000 km
2000 km
80000 km
160000 km
Corona
Transition region
Upper chromosphere
Lower chromosphere
Photospheric magnetic field

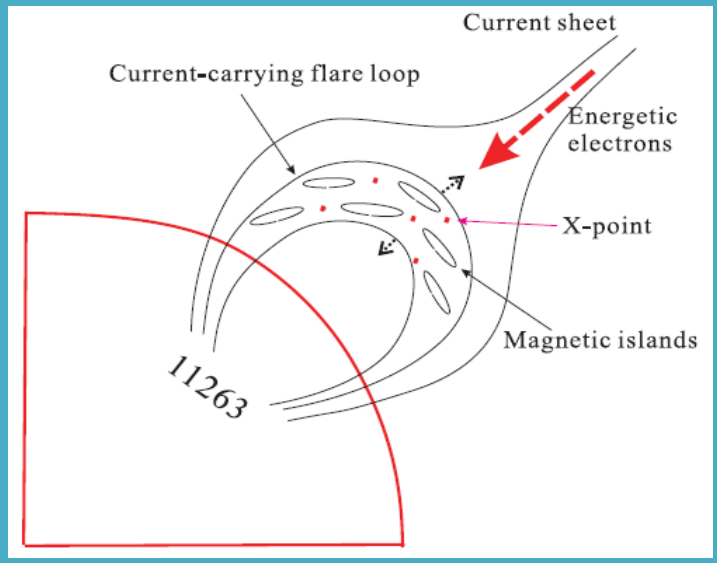


B. L. Tan

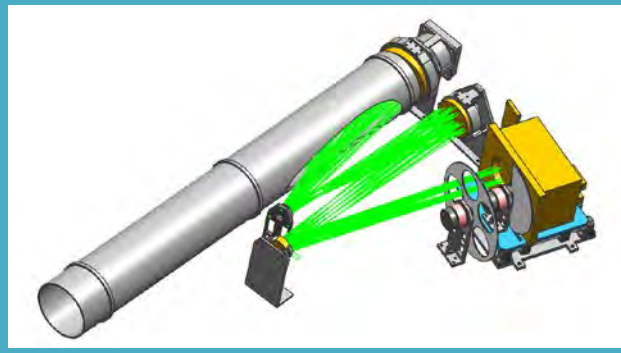
Mingantu Spectral Radioheliograph—MUSER

100 antenna, max. baseline: 3 km, array with 3 spiral arms

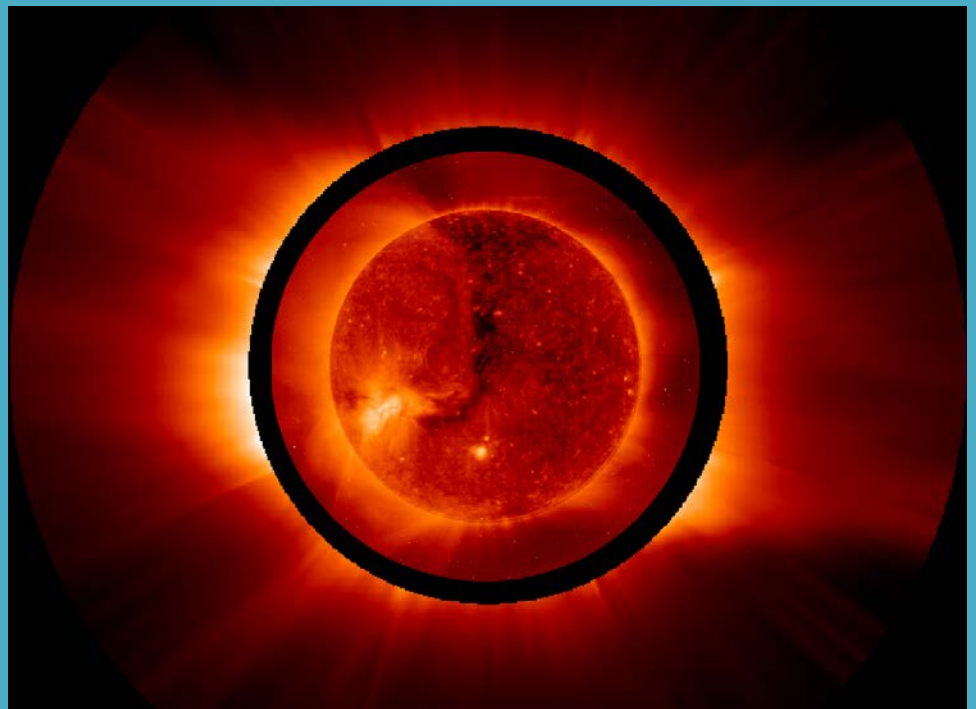




H. Li



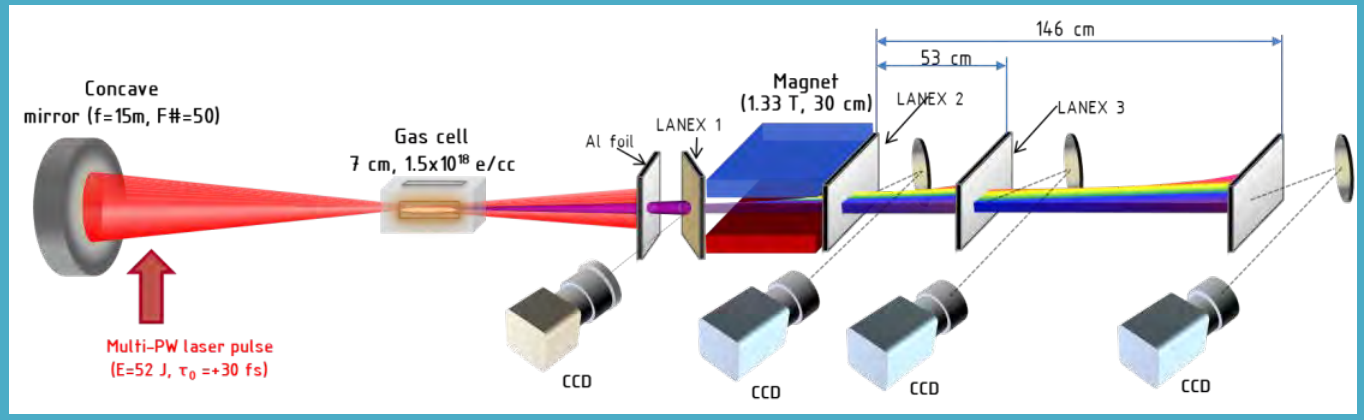
Ly-alpha Solar Telescope (LST)

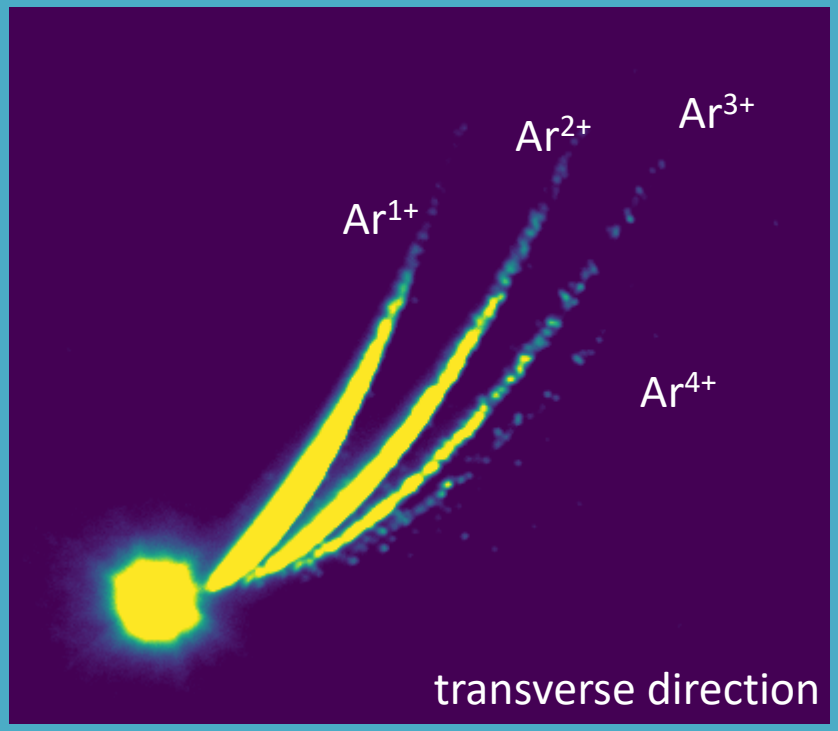


Lab Experiments

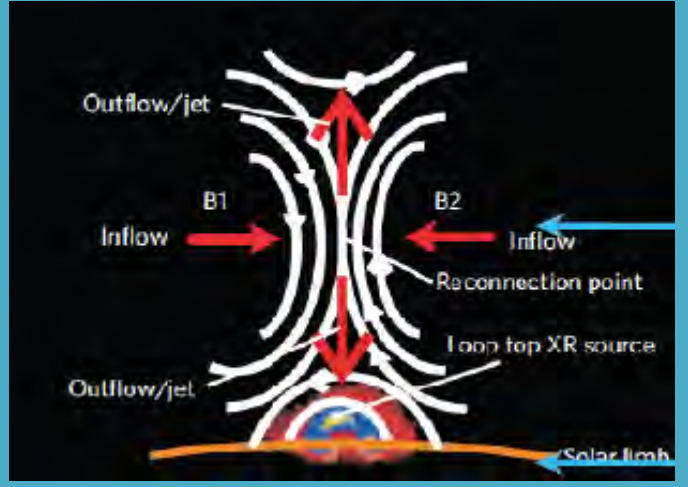
B. R. Lee

1 PW laser→reconnection



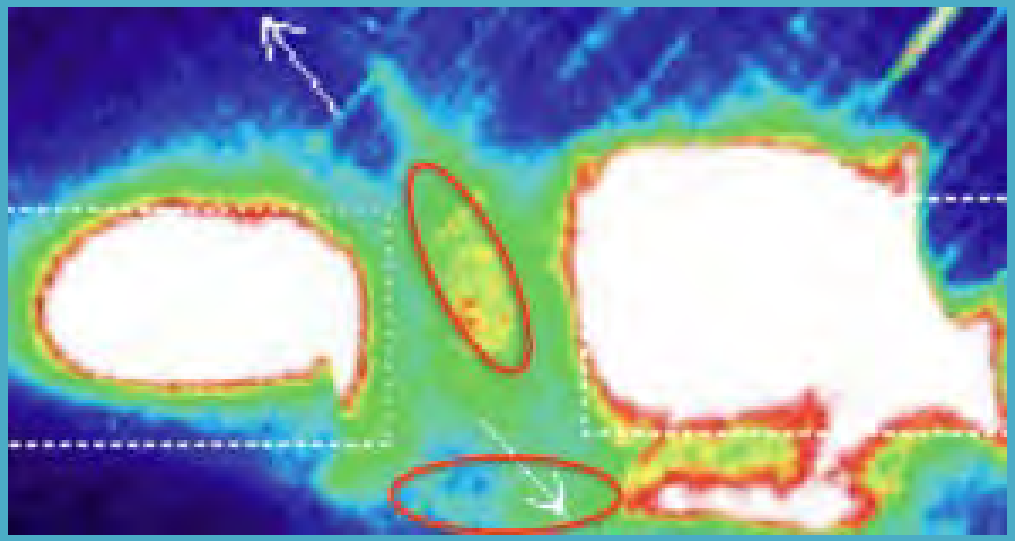


Ideas, papers



Mimic solar flare

J. Y. Zhong

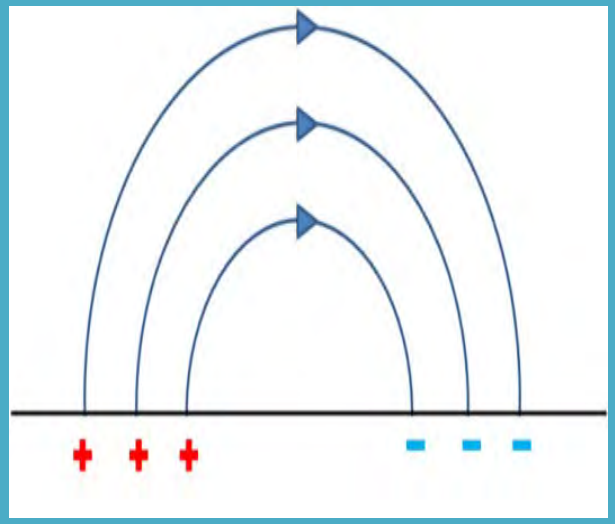


Low β & high β

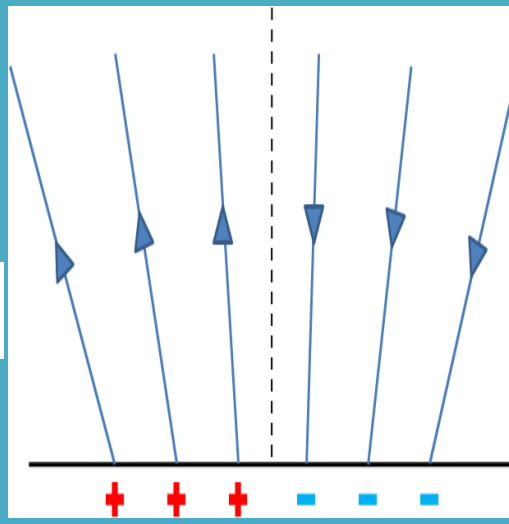
Challenging the orthodox

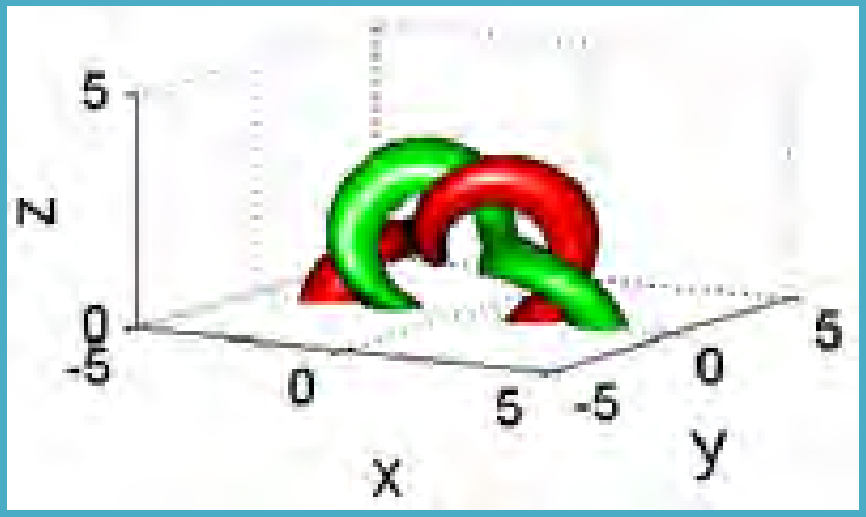
Aly-Sturrock Theorem

GS Choe



$$E_{\text{fff}} \leq E_{\text{open}}$$

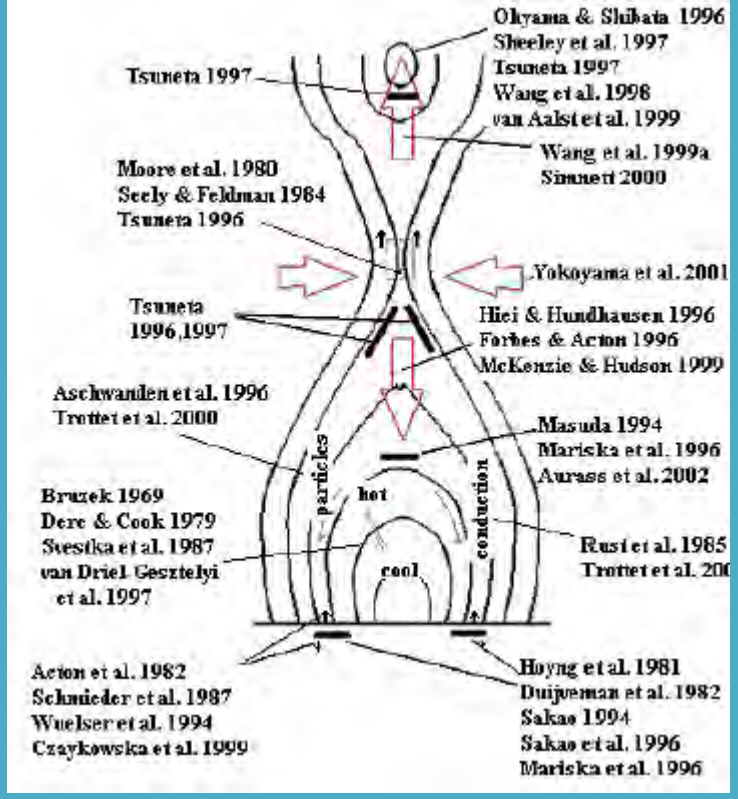




$E_{\text{force-free}} > E_{\text{open}}$

D. Melrose

Y. Bi



Standard reconnection model

Electromotive force (EMF) is missing, which is important.

Welcome back to China!

P. F. Chen

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