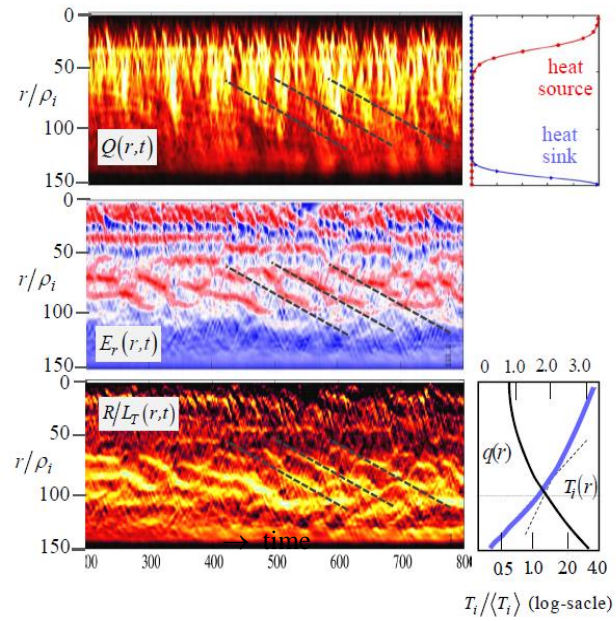


# TH/P3-2: Characteristics of turbulent transport in flux-driven toroidal plasmas

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We have presented an overall picture of ITG driven turbulent transport, a long-standing problem over 30 years, by achieving global flux-driven gyro-kinetic toroidal system sustained by heat source and sink incorporated with generation of global mean radial electric field.



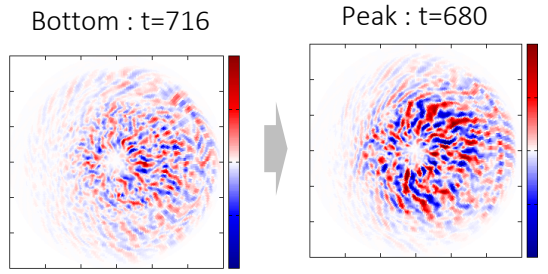
Temporal evolution of heat flux, radial electric, and scale-length

## Characteristics of transport

- Resilience and stiffness in profile weakly depending on heating
- Self-similarity in relaxation keeping specific function form and SOC type intermittent bursts.

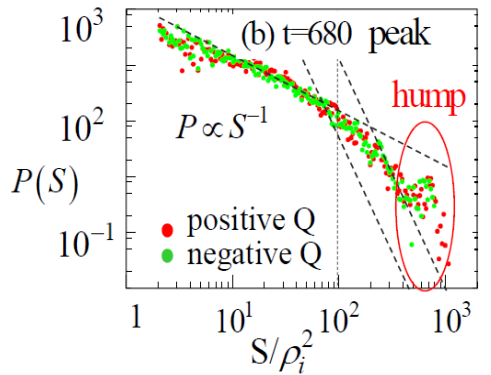
	4 types of transport event ( 3 non-diffusive)	Correlation length
①	Neo-classical transport and diffusive part of turbulent transport	$\ell_c \sim \rho_i$
②	Radially Localized avalanches with fast time scale toward both core and edge	$\ell_c \sim \rho_i - \sqrt{L_T \rho_i}$
③	Radially extended global ballooning type modes with meso- to macro scale causing instantaneous and intermittent bursts	$\ell_c \sim \sqrt{L_T \rho_i} - L_T$
④	Radially localized avalanches with slow time scale coupled with the evolution of ExB shear layer and pressure corrugation	$\ell_c \sim \sqrt{L_T \rho_i} - L_T$

## ③ Origin of global bursts and stiffness



Instantaneous phase alignment of small eddies leading to extended structure

## Size scaling of heat flux eddies



(b) t=680 peak  
 $P \propto S^{-1}$   
 hump  
 • positive Q  
 • negative Q