



### **Investigation of the Kelvin–Helmholtz instability in EAST**

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The Kelvin–Helmholtz (K-H) instability has been observed by Doppler Backscattering system(DBS) in EAST H-mode operation. The frequency range of the K-H instability is about 40-90 kHz, and is distinct in the Er fluctuation. Although it can be hardly observed in density and magnetic field fluctuation, the coherences between them and the Er fluctuation are quite strong, and the cross-phase between the density fluctuation and Er fluctuation is between  $\pi/2$  and  $\pi$ . The evolution of Er and Er shear during the appearance of K-H instability have been revealed, and it shows that the edge Er shear is important to arouse the K-H instability. The electric density and stored energy decrease significantly and the ELMy H-mode becomes an ELM-free H-mode operation when the K-H instability is aroused. The GAM can sometimes be observed accompanying with the K-H instability, and the nonlinear interaction between them has been observed through the bi-coherence analysis.