

Laser with Feedback in Crisis: Transition from Dropouts to Coherence Collapse

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advised by

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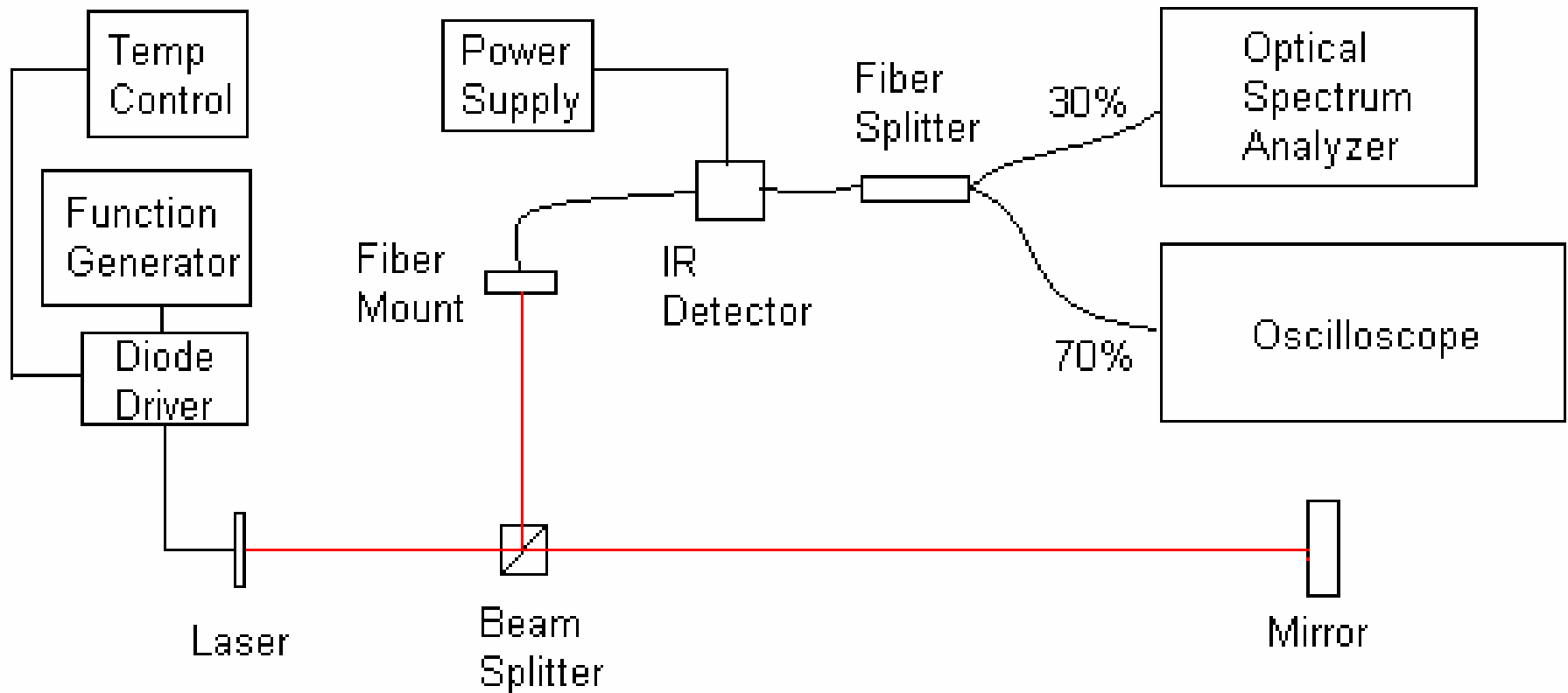


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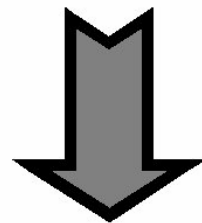
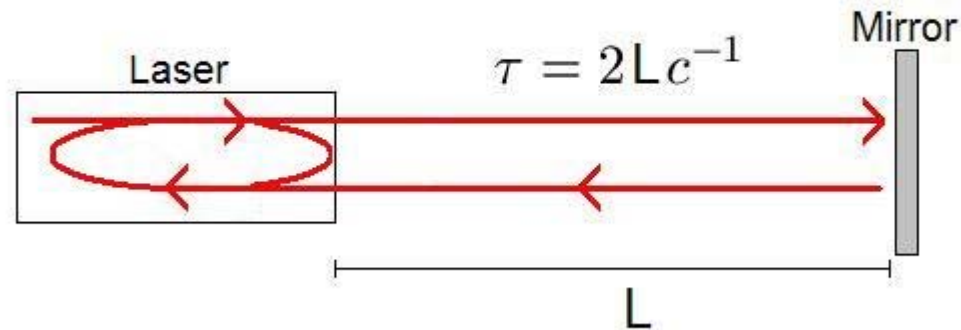


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experimental setup



model basics

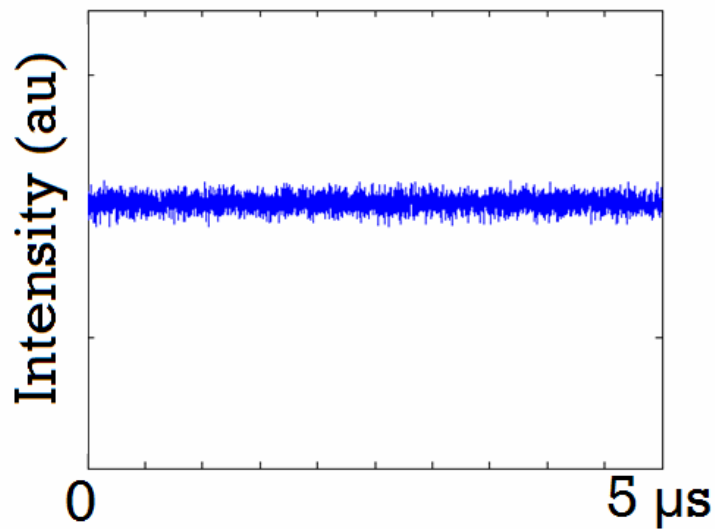


$$\frac{dE}{dt} = F(E(t), N(t)) + kE(t - \tau) + noise$$

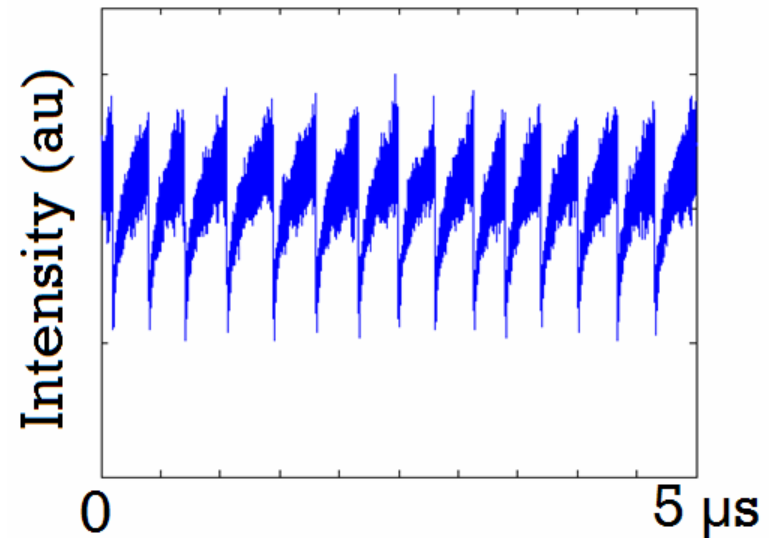
$$\frac{dN}{dt} = G(E(t), N(t))$$

effect of time-delayed feedback

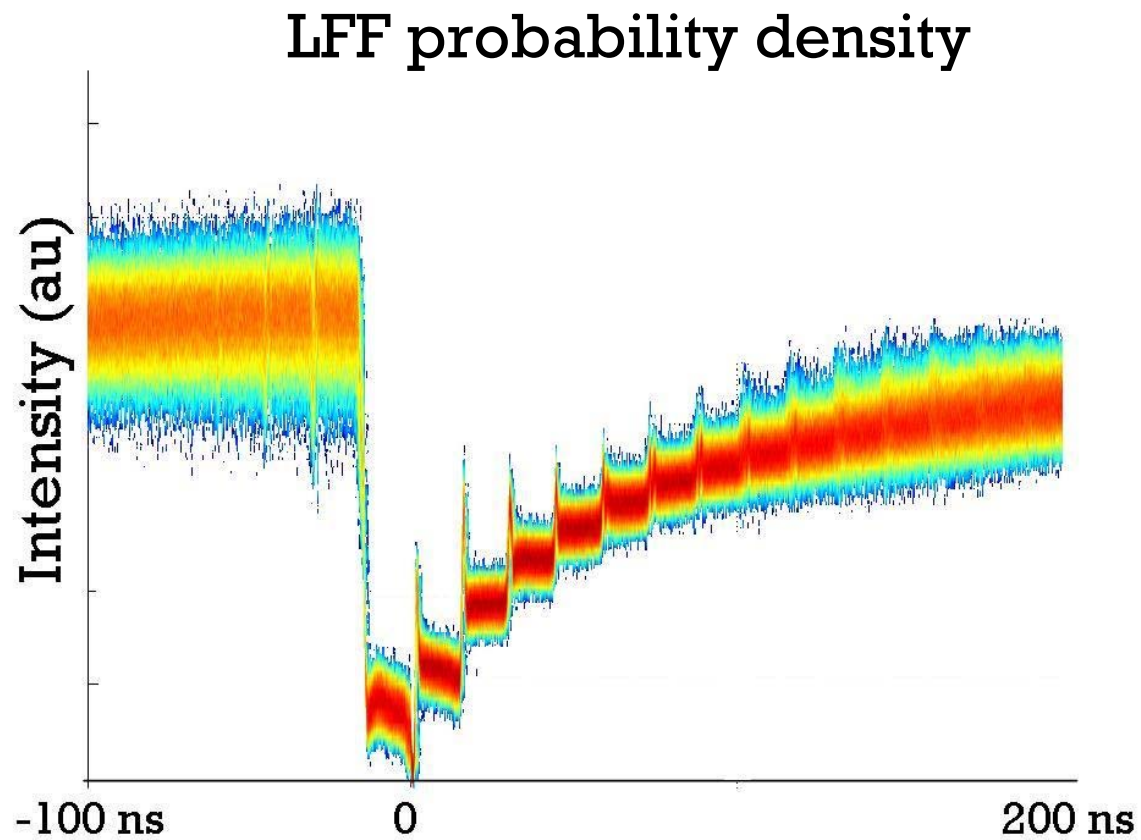
normal operation



with time-delayed feedback

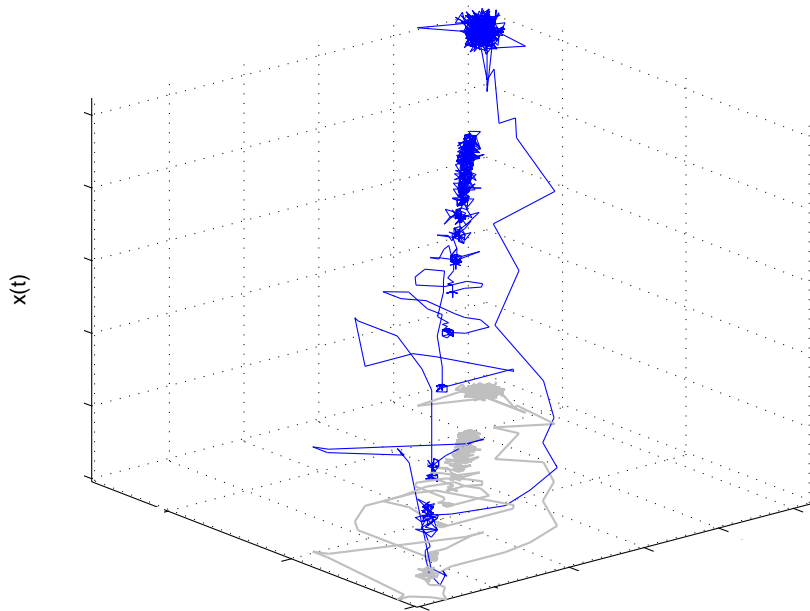


optimal paths

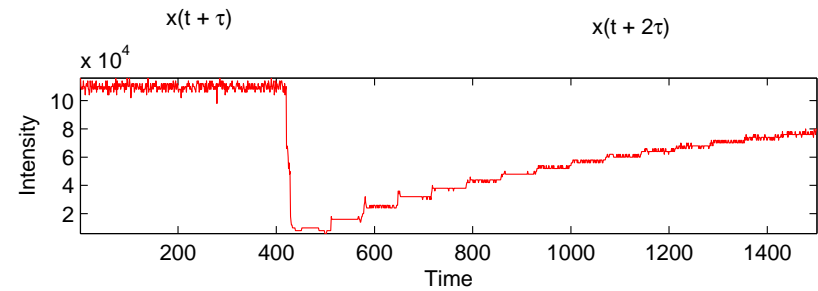
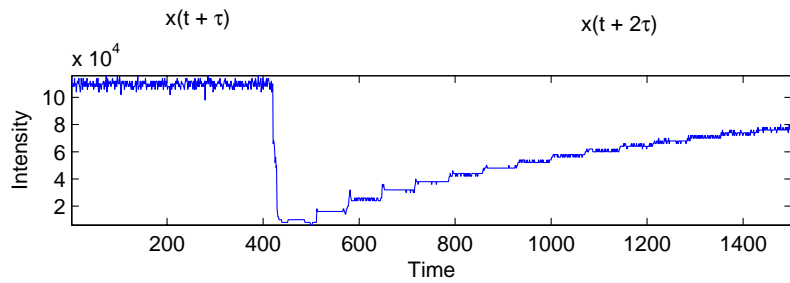
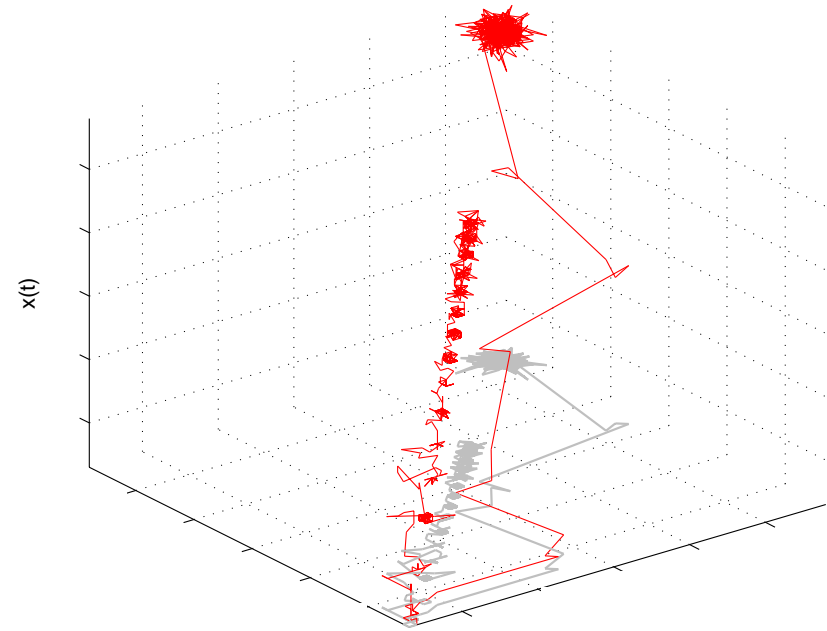


reconstructions

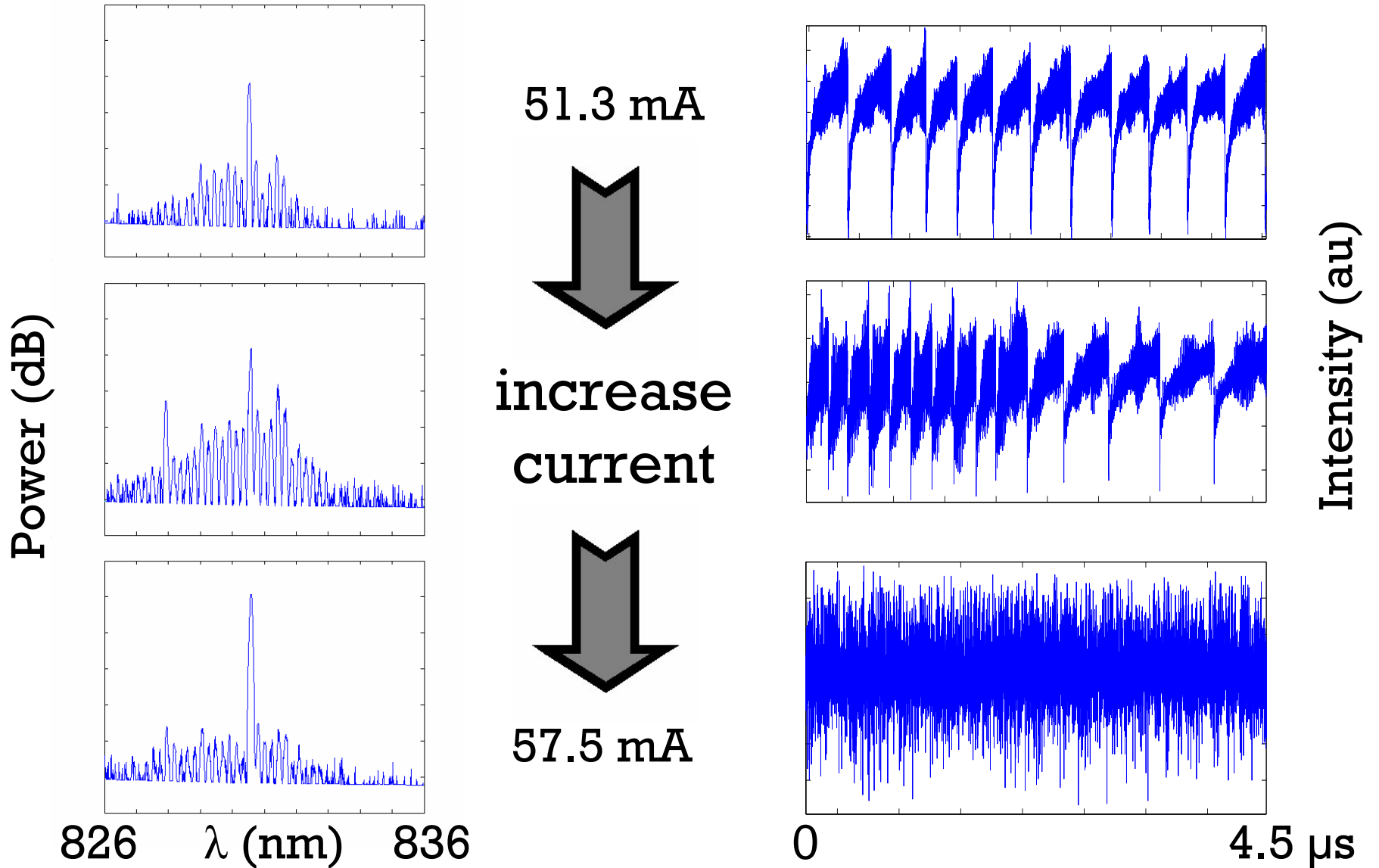
Experimental Data; $\tau = 3$



Simulation Data; $\tau = 3$

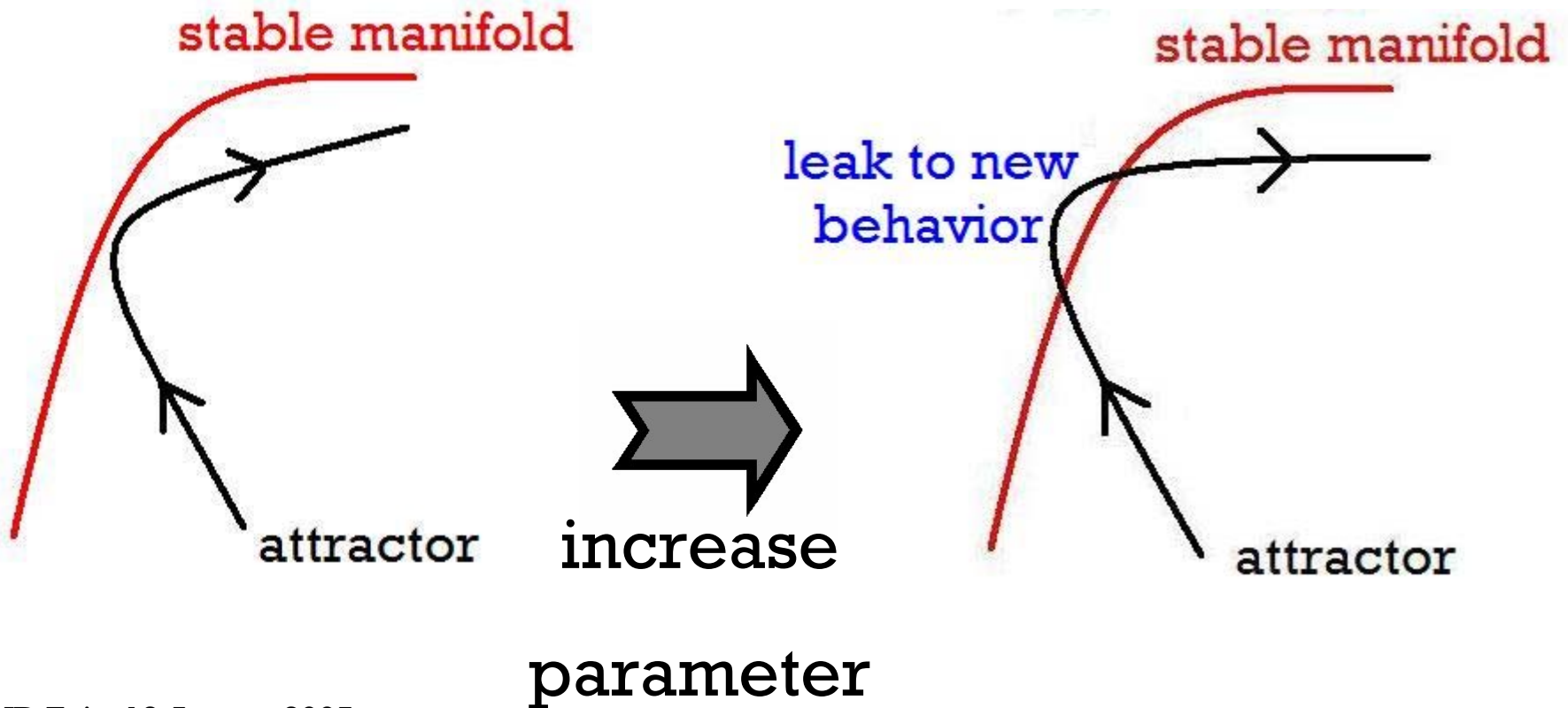


transitions



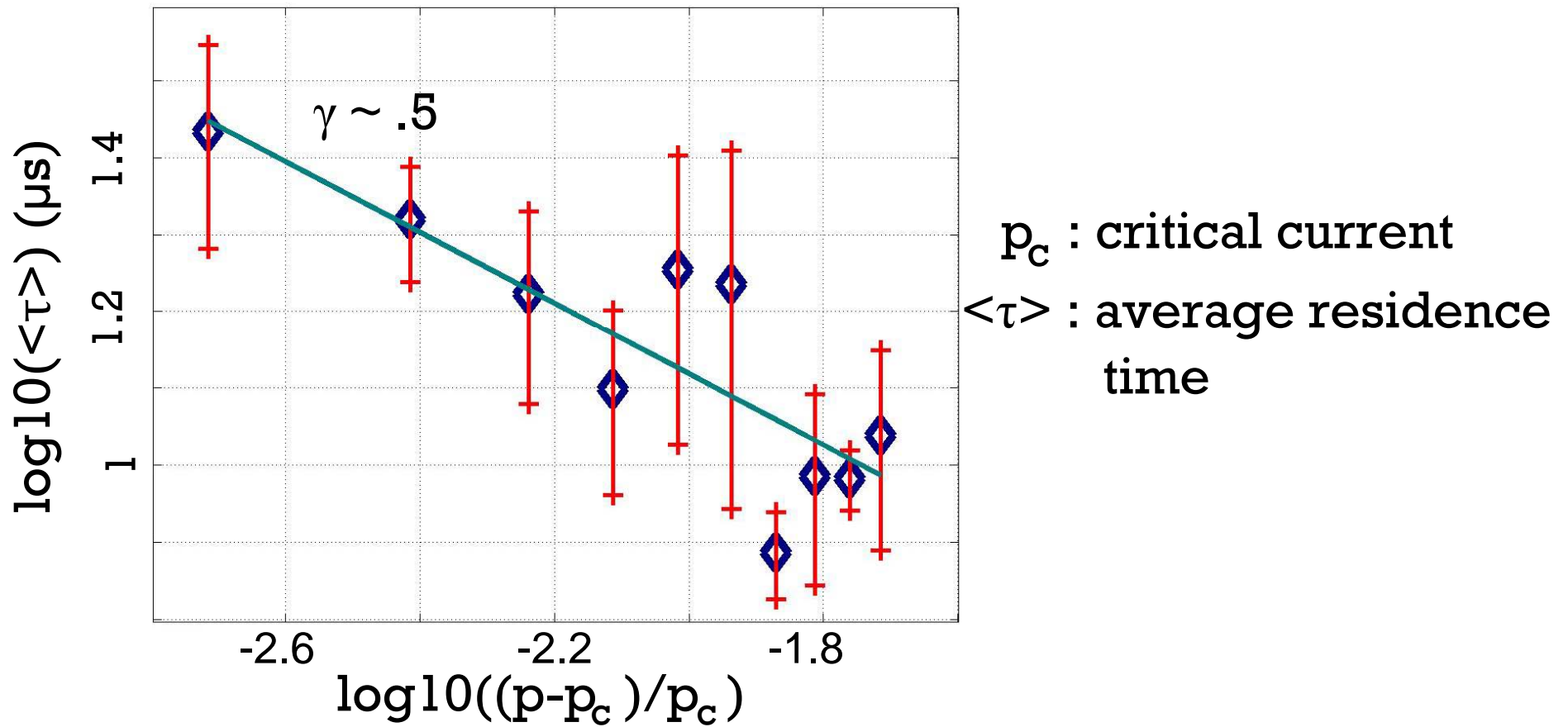
crisis

- * **sudden change** in an attractor when varying a parameter



scaling

crisis scaling: experiment



conclusions

- * **interior crisis** is responsible for transition behavior
- * single-mode Lang-Kobayashi is a **good approximation** for LFF and coherence collapse regimes
- * **multi-mode extension** to LK equations is needed to model the observed crisis