



# Phase transition in crowd synchrony of delay-coupled multilayer laser networks

Elad Cohen, Michael Rosenbluh, Ido Kanter

(Submitted on 17 Apr 2012)

An analogy between crowd synchrony and multi-layer neural network architectures is proposed. It indicates that many non-identical dynamical elements (oscillators) communicating indirectly via a few mediators (hubs) can synchronize when the number of delayed couplings to the hubs or the strength of the couplings is large enough. This phenomenon is modeled using a system of semiconductor lasers optically delay-coupled in either a fully connected or a diluted manner to a fixed number of non-identical central hub lasers. A universal phase transition to crowd synchrony with hysteresis is observed, where the time to achieve synchronization diverges near the critical coupling independent of the number of hubs.

Comments: 14 pages, 5 figures

Subjects: **Chaotic Dynamics (nlin.CD)**; Disordered Systems and Neural Networks (cond-mat.dis-nn)

Cite as: [arXiv:1204.3712 \[nlin.CD\]](#)  
(or [arXiv:1204.3712v1 \[nlin.CD\]](#) for this version)

## Submission history

From: Ido Kanter [[view email](#)]

[v1] Tue, 17 Apr 2012 06:56:46 GMT (567kb)

[Which authors of this paper are endorsers?](#)

Link back to: [arXiv](#), [form interface](#), [contact](#).

## Download:

- [PDF only](#)

Current browse context:

nlin.CD

[< prev](#) | [next >](#)

[new](#) | [recent](#) | [1204](#)

Change to browse by:

[cond-mat](#)

[cond-mat.dis-nn](#)

[nlin](#)

## References & Citations

- [NASA ADS](#)

Bookmark([what is this?](#))

