



Characterization and control of chimera state collapses.

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Abstract– Studying signals from a mathematical model of a statistical physics dynamics, we show that an outbreak of global synchronization in a partly synchronized network is promoted by a synchronization drop in the weakly synchronized network part, rather than critically high synchronization [1]. This strikingly counterintuitive mechanism can be found also in nature, as we exemplify by epileptic seizures, indicating relevance for neurology and neuroscience. Our control scheme that applies this counterintuitive mechanism succeeds in both provoking and preventing global synchronization outbreaks. Further potential applications of this scheme include power-grid stabilization in electrical engineering and the therapy of various neurological diseases.

Acknowledgments

R.G.A. and F.M. acknowledge funding from the Volkswagen foundation. R.G.A. was supported by the Spanish Ministry of Economy and Competitiveness (Grant FIS2014-54177-R). This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 642563 (R.G.A.). F.M. acknowledges support from the German Research Council (DFG, MO 930/4-1 and SFB 1089) and the European Commission (FP7 602102 EPITARGET). K.S. and C.R. are grateful for support by the Swiss National Science Foundation (Projects No. SNF 320030_122010, No. 33CM30-140332, No. 32003B_155950).

References

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