





















Fig. 5. MZM phase dependence of the RC performance in a time series prediction task, using the Santa-Fe data set. Best performance for  $\beta = 0.2$  is found around  $\Phi_0 = 0.1\pi$ ,  $\Phi_0 = 0.5\pi$ ,  $\Phi_0 = 0.7\pi$  and  $\Phi_0 = 0.85\pi$  phase values in the vicinity of local extrema of the transfer function of the MZM (see Figs. 4(d), 1(a), and 1(b)).

allow for direct interconnection between optical communication and information processing.

Major work needs to be done in the future in order to explore the full potential of our approach, including scaling possibilities. In addition, implementation of more advanced features, e.g. enhancing the connectivity of the virtual network, real-time post-processing and plasticity rules to optimize the reservoir for the corresponding task during the training phase, are foreseen.

### Acknowledgments

We would like to thank J. Danckaert, G. Van der Sande and the members of the PHOCUS consortium for fruitful discussions. The project PHOCUS acknowledges the financial support of the Future and Emerging Technologies (FET) programme within the Seventh Framework Programme for Research of the European Commission, under FET-Open grant number: 240763. Moreover, this work was supported by MICINN (Spain), and FEDER, under Projects TEC2009-14101 (DeCoDicA), FIS2007-60327 (FISICOS), and 0200950I190 (Proyecto Intramurales Especiales). LL thanks the institutional support of the Institut universitaire de France, as well as the Spanish Ministry for Research for a visiting professor position at the IFISC.