OBSERVATION OF OPTICAL COUPLING IN ARRAYS OF MICROCAVITY PLASMAS

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Arrays of glass microplasma devices afford the opportunity to study plasma and optical interactions between a single element and its neighbors. Recently, evidence of coupling phenomena between adjacent microplasmas has been reported in these arrays of microplasma devices.[1]

In this work, coupling between microcavities and microchannels is investigated and compared for different geometries, configurations and gas mixtures. The microcavity and microchannel devices having characteristic dimensions of 50 - 200 μm are fabricated on 400 μm thick glass substrates by replica molding and micropowder blasting. Spatially-resolved emission analysis implies that the behavior of neon microplasmas in arrays are differs considerably from that of a single element.

The axial core of the fluorescence produced by arrays of microchannel plasmas, for example, widens with increasing pressure from 100 to 700 Torr of neon. The different behavior of microplasmas between arrays and a single element has been studied for different values of dimensions, structures and gas composition. Also, temporally-resolved emission analysis will be discussed.

1. S.H. Sung, T.M. Spinka, Y.M. Kang, A.G. Berger, S.-J. Park, and J.G.. Eden, "Evidence for nearest neighbor coupling in arrays of ellipsoidal microcavity plasmas," *IEEE Tran. Plasma Sci.*, 36(4), 2008, pp.1246-1247.

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