

A New "Giant Luminous Arc" Gravitational Lens Associated with a $z = 0.62$ Galaxy Cluster, and the Environments of Distant Radio Galaxies

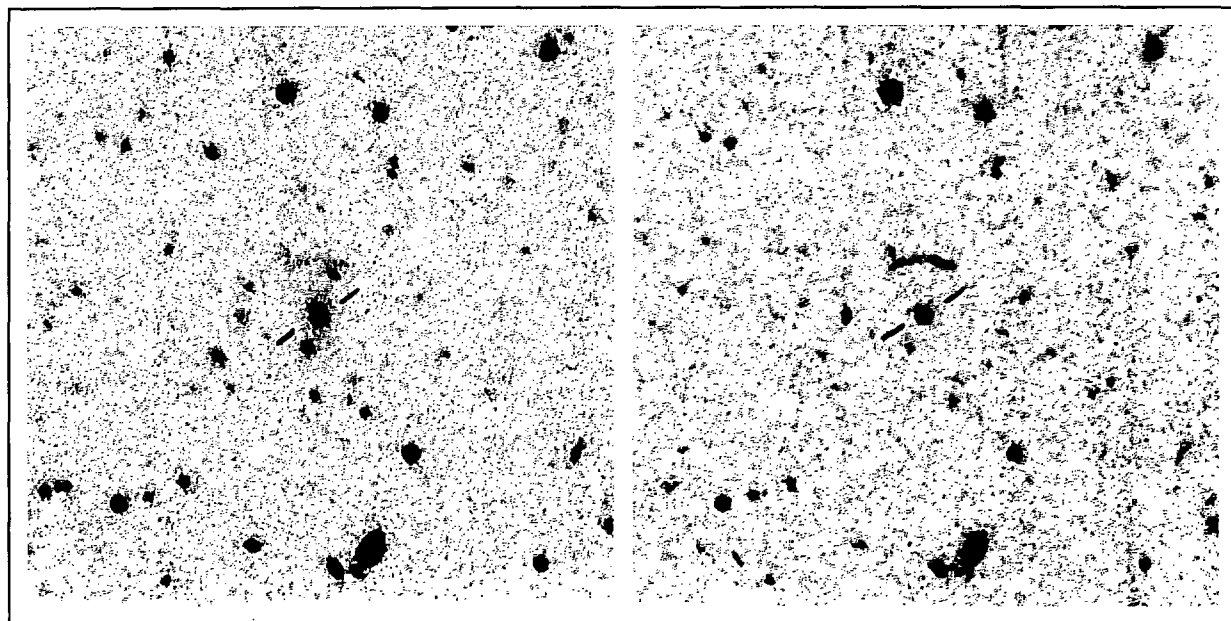
Mark Dickinson, U. C. Berkeley

In the course of a survey investigating the cluster environments of distant 3CR radio galaxies, I have identified a previously unknown "giant luminous arc" gravitational lens. The lensing cluster is associated with the radio galaxy 3C 220.1 at $z = 0.62$, and is the most distant cluster now known to produce such arcs. I present imaging and spectroscopic observations of the cluster and the arc, and discuss the implications for the cluster mass. At $z > 0.6$ the cluster velocity dispersions implied by such giant arcs may provide an interesting constraint on theories of large scale structure formation.

The parent investigation in which this arc was identified concerns galaxy clusters and radio galaxy environments at $0.35 < z < 0.8$. At the present epoch, powerful FR II radio galaxies tend to be found in environments of poor or average galaxy density [1,2]. In contrast, at the higher redshifts investigated here, richer group and cluster environments are common [3,4]. I present additional data on other clusters from this survey, and discuss its extension to $z > 1$ through a program of near-infrared and optical imaging.

References

1. Longair, M.S., and Seldner, M. (1979), *M.N.R.A.S.*, **189**, 433.
2. Prestage, R.M., and Peacock, J.A. (1988), *M.N.R.A.S.*, **230**, 131.
3. Yates, M.G., Miller, L., & Peacock, J.A. (1989), *M.N.R.A.S.*, **240**, 129.
4. Hill, G.J., & Lilly S.J. (1990), *Ap.J.*, **367**, 1.



3C 220.1 ($z = 0.62$), its cluster, and the associated gravitational lens arc. The radio galaxy is at the center of curvature of the arc, and is marked. KPNO 4m images: red (left) and blue (right). The field of view is 90 arcseconds on a side.