NO NEED FOR BLACK HOLES

The X-ray source Cyg X-1 has been identified with the binary system HD 226868. The X-ray emission shows short time (millisecond) variability but exhibits no periodicity. From this it is deduced that the X-ray emitting object is compact. Observations of the binary system has yielded the masses of about 25 $M_\odot$ and 11 $M_\odot$ for the two stars. Since the secondary is massive as well as compact, it is concluded that it must be a black hole. Not so, say Bahcall et al. (Ap. J. **189**, L17, 1974) and Fabian et al. (Nature **247**, 351, 1974). Their suggestion is that the system is actually a trinary, with a two star system consisting of a neutron star of 1 $M_\odot$ and another star of 10 $M_\odot$ which goes around the more massive star. This system satisfies the masses required by the binary observations of HD 226868. X-ray emission from the neutron star by accretion of gas from either of the stars satisfies the compactness demanded by the X-ray observations. Is such a system stable? Bahcall et al. followed the system for stability on a computer for about a 1000 neutron star orbits, but say they did not prove long term stability. At any rate, further investigations are definitely needed.

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DEPLETION OF INTERSTELLAR ATOMS

The fact that the observed interstellar abundance of Ca relative to hydrogen is smaller than its solar or cosmic value is well known (cf. H. J. Habing, B.A.I.N. **20**, 177, 1969). The observation from Copernicus satellite showed that the interstellar abundances of Mg, P, Cl and Mn relative to hydrogen are smaller than its solar values by a factor about 4 to 10 and several other elements are also depleted towards some of the stars (D. C. Morton et al, Ap. J. **181**, L103, 1973). The recent observation towards 15 stars by Wallerstein and Goldsmith (Ap. J. **187**, 237, 1974) show that Ti/H ratio is deficient in interstellar space by factors from 20 to 200. The new measurement of interstellar CaII/CaI ratio led White (Ap. J. **187**, 449, 1974) to the conclusion that not only Ca but also Na is underabundant in interstellar space. The observation of interstellar lines in the spectra of ξ Per, ζ Per and o Per in the region 3100Å $<\lambda<$ 4300Å by Schaffee (Ap. J. **189**, 427, 1974) also showed that Ca, Ti and Fe are underabundant on average by factors 1200, 800 and 5 respectively; Na has been found to be normal. From the observation of KI line towards 26 stars, Hobbs (Ap. J. **188**, L67, 1974) found that KI/H ratio in interstellar space is the same as in the Sun. This depletion of some of the elements in interstellar space has been explained as due to the accretion of atoms on interstellar dust grains (G. Wallerstein and D. Goldsmith, Ap. J. **187**, 237, 1974; R. E. White, Ap. J. **187**, 449, 1974; G. B. Field, Ap. J. **187**, 453, 1974). The idea that interstellar elemental abundances are decreased by accretion of atoms on dust grains, first discussed by Routly and Spitzer (Ap. J. **115**, 227, 1952) has recently received considerable attention for its implication in the cooling of interstellar gas (G. B. Field, D. W. Goldsmith and H. J. Habing, Ap. J. **155**, L149, 1969). The recent observations of widespread depletion of interstellar atoms have given a boost to this idea. In fact Field (Ap. J. **187**, 453, 1974) has found that the amount of depletion of some atoms towards ξ Oph correlates with their condensation temperature in the sense that depletion is more if the condensation temperature is large; this suggests, he argued, that these elements have condensed into dust grains near some star. The element deficient in interstellar space but having small condensation temperature have been accreted by grains in interstellar space. Greenberg (Ap. J. **189**, L81, 1974) has argued that the observed depletion of O, C and N in interstellar medium is significantly greater than that can be accounted for by accretion on dust grain and have given argument in favour of the presence of bodies intermediate between dust grain and comet in interstellar space. Note, however, that the observed depletion of atoms depends on observations of only one or two lines of each elements.

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GIANT RADIO SOURCES

More than half the observed extragalactic radio sources show a double structure with the optical galaxy located between the two radio components. The radio components are well outside the galaxy and have a typical separation of about 100 kpc. The largest known separations of the radio components are about 1 Mpc. In a recent paper, Willis, Strom and Wilson (Nature, **250,** 625, 1974) present observations using the Westerbork Synthesis Radio Telescope which show that two sources 3C236 and DA240, have separations of 5.7 and 2.0 Mpc respectively. Both these sources have been known for some time but their large radio size had not been detected earlier because they have strong, relatively compact, components associated with them and it is difficult to map weak extended sources when there are strong components nearby. It is essentially the recent developmenets in data processing techniques that have enabled Willis et al to map these extended sources.

In most of the simple models the separation of the radio components is proportional to their age and thus these two sources are the oldest known radio sources. From the apparent cut off in the radio separation at 1 Mpc the life time of double radio sources has been estimated to be about 10^7 years which is in reasonably good agreement with estimates of the lifetime from the observed frequency of radio sources and from the fact that breaks in the radio spectra due to synchrotron losses are seldom seen. These two giant sources, which are an order of magnitude older, do not fit into the picture and are likely to create difficulties for most of the models of extended radio sources. However, it is important to establish, through further observation, whether these large sources are common and more of them have not been detected because of observational difficulties or whether they are exceptional, in which case they are not of great significance to models for extragalactic radio sources.

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