M DWARFS AND THE MISSING MASS.

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This is a short report on our study of the M dwarfs in the South Galactic Pole region in connection with the problem of the missing mass and the luminosity function of intrinsically faint stars. The M-type stars found in our objective prism survey with the Lembang Schmidt telescope have been studied in collaboration with Dr. D.H.P. Jones for the discrimination between dwarfs and giants. Furthermore, these stars are all observed photo-electrically in Kron's R,I-system at La Silla, Chile. Results of the work will be published soon. A blink survey has been initiated at Nymegen using copies of red and blue Mt. Palomar Sky survey plates to find faint red stars in the S.G.P.-region.

Kumar has put forward the idea that Oort's missing mass is to be found as a large number of very low mass stars (0.01-0.07 $M_\odot$) in the solar neighbourhood. His idea is backed up by the fact that stars within this mass range have been found by double star observers. Staller suggested that the low velocity M dwarfs found in the directions of the galactic poles represent Kumar's very low mass stars. This proposal is ment not only for giving an answer to the problem of the missing mass but also for those problem connected with the observed small velocity dispersion (10-15 km/sec) of the low velocity M dwarfs. Staller estimated the contracting and cooling times of these stars to be about 5×10^8 to 10^9 years. In the lifetime of our galaxy (about 10^{10} years) 10 to 20 generations of these low mass stars have been created and evolve to very faint degenerated black dwarfs. The mass density of these stars, in the solar neighbourhood, will be large enough to solve the problem of the missing mass. The stars we observe at present as low velocity M stars are genuinely young red stars, and their small velocity dispersion will therefore not contradict Spitzer and Schwarzschild's mechanism for the creation of velocity dispersion by encounters with interstellar clouds. The age of the older very faint black dwarfs is comparable to that of our galaxy. These stars should therefore have a large velocity dispersion. Staller has shown that on the average the low mass stars have a velocity dispersion larger than 21 km/sec, and therefore the whole group of low mass stars is satisfying Toomre's stability criterion for the galactic disk, such as newly derived by Biermann.

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