avoidance of the galactic plane (| b^{II} |> 25°), *(ii)* restrictions to fields of medium/high X-ray sensitivity (2–4×10^{-13} erg cm^{-2} s^{-1}), and *(iii)* distribution in R.A. allowing year-round follow-up observations.

The project is a collaboration between the Instituto Nacional de Astrofísica, Optica y Electrónica (INAOE), Puebla, México, the Landessternwarte Heidelberg (LSW), and the Max-Planck-Institut für Extraterrestrische Physik (MPE), Garching. For the purpose of this programme the LSW has constructed an efficient faint object spectrograph (LFOSC) which allows to carry out direct CCD imaging, filter photometry, and multiple-object spectroscopy. Two grisms giving 13 and 21 A spectral resolution are available. The observations are being carried out at the 2.1-m telescope of the Guillermo Haro Observatory which is operated by INAOE and located near Cananea, Sonora, México.

By now about 40% of the optical observing programme has been completed. Among the identified sources are stellar X-ray emitters, normal and active galaxies, and clusters of galaxies. About one quarter of the identified sources are AGN or QSOs, mainly at low to medium redshifts, although a few QSOs in our sample have $z > 2$.

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CALIBRATIONS OF M_V, [Fe/H] AND LOG G FOR YELLOW SUPERGIANT STARS

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Photoelectric observations of the OI7774 feature and *uvby*-β photometry of luminous A-G type stars has been used to derive functional formulae to estimate M_V, log g and [Fe/H]. These calibrations are found to predict gravities and iron abundances with uncertainties not much higher than good spectroscopic determinations. When the calibrations are applied to a group of A-G stars of high galactic latitude classified as supergiants, it is found that they are in the galactic plane or are misclassified as supergiants. BL Telescopii is found however to be luminous, slightly iron deficient and far from the galactic plane. These results are consistent with the idea that BL Telescopii is a massive and young object placed out of the galactic plane.

EVOLUTION OF HELIUM STARS IN MASSIVE CLOSE BINARY SYSTEMS[1]

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The evolution of the 2.0, 2.2, 2.5, 2.9, 3.5, 4.0 and 6.0 $M_\odot$ helium stars (X = 0.0, Y = 0.97) to the carbon ignition was calculated. With the help of a simple procedure for the determination of the helium convective core-boundary the influence of overshooting at the edge of it was accounted. Results of the evolution of these stars are presented. If the helium stars formed in massive close binary systems have masses from 6.0 to 2.0 $M_\odot$, and if the orbital separations between the components are less than ~2–10 $R_\odot$ respectively (the second components are assumed to be compact objects), then the helium stars are able to reach their Roche lobes before the carbon ignition in the core. Therefore a mass loss phase (non-conservative) arises. Such a phase is numerically investigated. The remnant masses, time scales and other characteristics of this phase were obtained. We deduced an approximate formula for the remnant stellar mass:

$$M_r \approx (0.89\, M_{He}^{0.96} - 0.40)\, (R_R/0.6)^{0.2},$$

where M_{He} is the mass of the initial helium star and R_R the Roche-lobe radius. The helium stars more massive than 2.2 $M_\odot$ undergo a SN explosion and form neutron stars (after the mass loss phase). If the system does not disintegrate after the explosion, then it might be the progenitor of a binary radiopulsar. The initial helium-star mass and the orbital separation of such a binary radiopulsar are estimated. For instance, we estimated that the progenitor of the well-known PSR 1913+16 was a binary system with a 4.03 $M_\odot$ helium star and an orbital separation of 1.66 $R_\odot$. A 4.02 $M_\odot$ helium star originates from a 13 $M_\odot$ ms-star, and such a small orbital separation results after a common-envelope phase.

The calculations were carried out at the Institute of Astronomy of the Russian Academy of Sciences, and in the Department of Astronomy of St. Petersburg University.