

High-Resolution Coudé-Echelle Spectrometer for the 1.5-m Kazan University Telescope at the Turkish National Observatory

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Modern tasks of stellar spectroscopy demand the registration of spectra with high spectral resolution and high signal-to-noise ratio over a broad spectral region. The only way to realize these requirements simultaneously is with an echelle spectrometer working with a large-format CCD. For 1–3-m class telescopes such spectrometers would be installed in separate coudé rooms. We propose a project of modern coudé instrumentation for the 1.5-m Kazan University telescope being installed at the Turkish National Observatory in 1997. The use of two echelle gratings (R2 and R4) with prisms as cross-dispersers and two optical cameras will provide a spectral resolution up to $R = 200,000$ in a wide spectral range from 3500 to 9500 Å. As a basic model, the optical scheme of the coudé-echelle spectrometer of the 1-m SAO RAS telescope has been adopted. This spectrometer was designed and constructed during 1993–95 and is now providing high-quality spectral data (Musaev 1996, *Astronomy Letters*, v. 22, n. 10).

To obtain high-quality spectra during long observing periods, there are some important technical requirements for the telescope tower: (a) the coudé room should be well temperature-controlled and mechanically stabilized, (b) there should be no (or minimal) heat sources inside the tower, and (c) the telescope's automatic control system should be situated in a separate room at the 1st floor, or even outside the tower. The telescope tower is now being constructed by our Turkish collaborators according to these requirements (<http://astroa.physics.metu.edu.tr>).

Some of the spectrometer's optical elements have been manufactured in Russia during 1995–96 and we expect that observations will start in 1998. The main scientific goals for the coudé instrumentation of this 1.5-m telescope are: (a) detailed chemical composition determination of the atmospheres of hot and cool stars down to 8th magnitude, (b) study of spectral line profiles and possible time variations of line profiles with a resolution $R = 40,000 - 200,000$ and S/N ratio > 100 , (c) the production of stellar atlases of a sample of bright stars of different spectral types, (d) a search for low-amplitude ($50-500 \text{ m s}^{-1}$) variations of radial velocities of cool stars, (e) study of the spectra of magnetic A–F stars, and (f) study of the local interstellar medium.