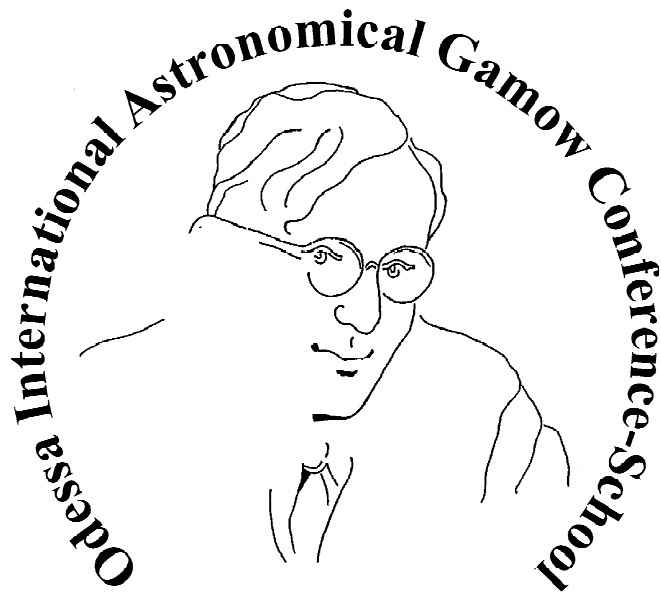# 21-th Gamow International Astronomical Conference-School
"ASTRONOMY AND BEYOND: ASTROPHYSICS, COSMOLOGY AND GRAVITATION, HIGH ENERGY PHYSICS, ASTROPARTICLE PHYSICS, RADIOASTRONOMY AND ASTROBIOLOGY"

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ABSTRACTS

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possible to found regularities of period changes of other variables within error estimates due to relatively small amount of observed cycles.

SOME FEATURES OF VARIABILITY OF THE LIGHT CURVE OF THE RR LYR-TYPE PULSATING VARIABLE FI SGE

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We present the result of tree-seasons photometrical observations of the FI Sge, scantly explored RR Lyr-type variable. The observational data were obtained using the 48-cm telescope AZT-3 of SRI "Astronomical observatory", I. I. Mechnicov Odessa National University. The telescope is equipped with a CCD camera and light filters which realize instrumental photometric system closely approximating the standard V-R-I bands. The observation data were obtained in 2013-2018.We obtained 55 full individual light curves. Using frequency analysis (Period 04 set) we estimated the period of the Blazhko effect for amplitude and phase of the fundamental period as well as we detected the variations of the fundamental period.

We obtained the characteristics of the light curve of explored star showing the Blazhko effect.

MATEMATICAL MODELING OF PHYSICAL VARIABILITY OF SEMI-REGULAR STAR RX BOO WITH MASER EMISSION

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The historical light curve of the semi-regular pulsating star with a maser emission, is analyzed based on the AAVSO database. While the star is extensively studied in the IR and radio, the optical behavior was discussed in 2006. The star was marked by the "Variable Star of the Season" for June, 2021.

Our previous study (1988AN....309..323A) was based on 349 photovisual observations obtained in the Astronomical Observatory of the Odessa National University. The periodogram showed the peaks at 352 ± 5^d, 179.1 ± 0.3^d and 162.4 ± 0.8^d. Speil (2006JAVSO..35...88S) reports on a double periodicity with 160^d and 278^d.

Current study is based on 13220 (visual+V) observations obtained in 1938-2021. The periodogram (using the trigonometric polynomial approximation of order s=1) shows few (formally) statistically significant peaks, also at 160.4d, but the strongest one is at 17970 ± 270^d ($T\_max=2446890\pm71$, semi-amplitude 171 ± 5 mmag) with apparently strong peaks at 4448^d, 2289^d, 1027^d, 568^d, 372^d, 286^d. The trigonometric polynomial of order s=16 shows a chaotic curve with a formal period $P=17110\pm27^d$. However, the presence of so many peaks shows that there are no "true" periods, but "cycle lengths". The "Lambda-scalegram" analysis (2003ASPC..292..391A) shows similar multiple peaks. The "Running sine" (2013CKA....10..171A) approximation (with a period 160^d listed in the GCVS) shows drastic changes of the phase curve. In an addition to pulsations, we suggest a possible binarity for a 17 kiloday variability, and weakenings due to the dust events like that recently observed in Betelgeuse, DY Per (2020AANv....1..179A) and other stars.

TYC5594-576-1: r-PROCESS ENRICHMENT METAL-POOR STAR

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Atmospheric parameters and elemental abundances of metal-poor star TYC5594-576-1 ([Fe/H] = -2.8), including elements of neutron (n-) capture processes, which are important in the analysis of enrichment sources of early Galaxy, have been studied. Na, Mg, Al, Co, Sr, Y, Zr, Mo, Ba, La, Ce, Pr, Sm, Eu, Gd, Dy, Os, and Th abundances were calculated using the synthetic spectrum method, taken into account the hyperfine structure (HFS) for the Ba, La, Eu II lines. Si, Ca, Sc, Ni abundances were determined based on the equivalent widths of their lines. The carbon abundance was obtained by the molecular synthesis fitting for the region of CH (4300-4330 ÅÅ). For the abundances determinations of C, Na, Mg, Al, Ba, and Th the NLTE corrections have been applied.

We have determined for the first time the abundances of several n-capture elements and found that the behaviours of these elements show a significant trend with increasing atomic number, that support the TYC5594-576-1 status as a r-process enrichment star.

INVESTIGATION OF PLANETARY SYSTEMS TRES-3, KEPLER-17, WASP-3, QATAR-1 AND QATAR-2 BY TRANSIT PHOTOMETRY

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We present the results of investigation of five exoplanets tranzits: TrES-3b, Kepler-17b, WASP-3b, Qatar-1b and Qatar-2b. Observations were carried out for eight nights (from 2 April to 10 July 2021) by using a 70-cm reflecting telescope AZT-8 on Observing station Lisnyky (Kyiv, Ukraine). Photometric processing of the observation results was performed by using the Muniwin program. The obtained exoplanet transit brightness curves were published in Exoplanet Transit Database (ETD). The accuracy and quality of our observations on the ETD database scale ranged from 1 to 3.