

BOOK OF ABSTRACTS



Actual Questions of Ground-based Observational Astronomy

MAO-200

September 27-30, 2021, Mykolaiv, Ukraine

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
RESEARCH INSTITUTE “MYKOLAIV ASTRONOMICAL OBSERVATORY”

**ACTUAL QUESTIONS OF GROUND-BASED
OBSERVATIONAL ASTRONOMY**

International Conference

ABSTRACT BOOK

September 27-30, 2021,
Mykolaiv, Ukraine

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Ministry of Education and Science of Ukraine
Ukrainian Astronomical Association

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The Book of Abstracts contains abstracts of presentations to the International Conference “Actual Questions of Ground-based Observational Astronomy” to be held in Mykolaiv, Ukraine, on September 27-30, 2021. Methods and technical means of ground-based observations, a role of the International Virtual Observatory Alliance (IVOA) in modern research and actual problems of ground-based astronomy are presented.

**OBSERVATION OF GEO AND LEO SATELLITES BY
RADIO-TECHNICAL MEANS IN THE RESEARCH
INSTITUTE "MYKOLAIV ASTRONOMICAL
OBSERVATORY"**

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The RI "MAO" radio-technical means are fully passive. To track satellites they use radio signals emitted by the satellites themselves. Thus, the following were developed and put into operation: 1) Simple INTerferometer NETwork (SintNet) for monitoring the orbital position of geostationary (GEO) satellites; 2) Doppler station (DS) for clarifying the orbital elements of low Earth orbit (LEO) satellites. Two SintNet operate now: European and Chinese. The European SintNet consists of 10 stations and tracks 3 co-located satellites simultaneously. The Chinese SintNet consists of 4 stations and tracks one satellite. The error in determining the coordinates of the satellites is about 200 m.

The Doppler station operates in the frequency range 430-440 MHz. It uses signal spectrum analysis to determine the frequency $F(t)$ of the radio signal emitted by LEO satellite and received by the station at time t . The SGP4/SDP4 analytical model of the satellite's motion is applied to the analysis $F(t)$ and to clarify the satellite orbital elements. Errors in the measurement of the Doppler frequency shift and time are 4 sm/s and 30 ms respectively.