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Development of tools for real-time betatron tune measurement at Nuclotron

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Betatron tune is one of the important beam parameters that must be known and controlled to avoid the beam instability of the circular particle accelerator. A real-time method for betatron tune measurements at Nuclotron and NICA Booster was developed and tested. A bandlimited noise source and chirp (frequency sweep) was used for beam excitation. The transversal beam oscillation signals were sampled either with a constant frequency or with a beam revolution frequency and digitized with a high resolution ADCs. The Fourier transform of the acquired data represents immediately both X and Z betatron tunes. The report presents the current state of the measurement system, beam test results and future improvements.

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