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The Large European Array for Pulsars: a leap of the EPTA for gravitational wave detection

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Searching for gravitational waves has nowadays been a vital astrophysical experiment in gravity and pulsar timing array (PTA) constitutes the major effort in low frequency regime. The detection of gravitational waves with PTAs relies on the technique of high precision pulsar timing currently achieved with the 100-m class radio telescopes. In this talk, I will present an overview of the Large European Array for Pulsars (LEAP), a key project within the European PTA collaboration to optimally use the largest radio telescopes in Europe to detect gravitational waves. I will first give a brief introduction of the current state-of-the-art EPTA timing observations. I will then provide a description of LEAP's experimental design and an update on its latest status. In addition, I will show the preliminary results on pulsar timing and prospect the contribution of LEAP data into the entire EPTA database, in the light of new limits on gravitational wave background and even the first detection. Finally, I will mention the studies with LEAP on instability of pulsar profiles which will limit the achievable precision of pulsar timing with the next generation of radio telescopes, e.g., the Square-Kilometre-Array.

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