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On the pulse-width statistics in radio pulsars. II. Importance of the core profile components

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We performed a statistical analysis of half-power pulse-widths of the core components in average pulsar profiles. We confirmed an existence of the lower bound of the distribution of half-power pulse-width versus the pulsar period $W_{50} \sim 2.45 \text{ deg } P^{-0.5}$ found by Rankin (1990). Using our much larger database we found $W_{50} = (2.51 \pm 0.08) \text{ deg } P^{-0.50 \pm 0.02}$ for 21 pulsars with double-pole interpulses for which measurement of the core component width was possible. On the other hand, all single-pole interpulse cases lie in the swarm of pulsars above the boundary line. Using the Monte Carlo simulations based on exact geometrical calculations we found that the Rankin's method of estimation of the inclination angle $\alpha \sim \arcsin(2.45 \text{ deg } P^{-0.5} / W_{50})$ in pulsars with core components is quite good an approximation, except for very small angles α in almost aligned rotators.

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