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Unveiling the structure and kinematics of the Milky Way disk with A stars

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A-type stars are intrinsically bright, moderately numerous and kinetically warm. They trace the Galactic disk evolution at intermediate ages (0.3-1.0 Gyr), so they fill the gap between younger OB stars and older red giants. We present a catalogue of A-type stars selected in the northern Galactic plane (30°≤l≤215° and |b|≤5°) using photometry from the INT Galactic Plane Survey (IGAPS). It contains over 3.5 million sources up to magnitude r≤19 mag. We use *Gaia* Data Release 3 parallaxes, proper motions and line-of-sight velocities of these A-type stars to analyse the large-scale structure of the Milky Way disc and their kinematic distribution up to 6 kpc from the Sun.

We find stellar overdensities associated with the Local and the Perseus spiral arms, as well as with the Cygnus region. We also detect the Galactic warp towards the anticentre starting at Galactocentric radius R≈12 kpc and having a median vertical motion of ~7-8 km/s at R=14 kpc. This onset radius supports that the warp begins at larger radii on younger stellar tracers than on older ones. We also detect a region with downward motion extending beyond 2 kpc from the Sun towards 60°≤l≤75° that can be associated with a compression breathing mode. Furthermore, A-type stars reveal very clumpy inhomogeneities and asymmetries in the V_Z-V_φ velocity space plane.

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