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Accretion and rotation power in ms pulsars

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Neutron stars in low mass X-ray binaries can be spun-up to millisecond rotational periods by accreting the matter transferred by a companion star. When the rate of mass transfer decreases at the end of this Gyr-long X-ray bright phase, a radio pulsar powered by the rotation of the neutron star magnetic field turns on. Recently, the evolutionary link between these two classes of sources was finally proven by the XMM-Newton discovery of a millisecond pulsar observed to swing between accretion (X-ray bright) and rotation (radio bright) pulsar behaviour. This source is the prototype of a new class of transitional systems that alternate between accretion and rotation-powered states in response to variations of the rate of mass in-flow, on time scales as short as a couple of weeks. Observations of this and other similar systems indicate that transitions to the accretion phase not only involve bright X-ray outbursts, but also a fainter intermediate X-ray state, possibly caused by centrifugal inhibition of the matter in-fall. I will summarize the main observed properties, as well as prospects of finding more sources of this newly established class.

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