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Abstract:

The eclipsing millisecond pulsars with low-mass companions, namely black widow pulsars, are crucial to understand the millisecond pulsars recycling scenario. The low-mass companions and their atmospheres are likely to be ablated by the irradiation and the pulsar wind. We propose to probe atomic composition in the gas ablated from the companion by searching for HI absorption lines against pulsars and simultaneously measure the magnetic field strengths directly through Zeeman splitting. Any detection would be a major discovery and thus help constrain the evolutionary history and the formation scenarios of the millisecond pulsars with low-mass companions.