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Abstract:

Under the FAST pulsar searching project PT2020\_0096, we discovered a new 2.7 millisecond pulsar (MSP), M5G, in the globular cluster M5. With one pulsar discovered by us, the number of known pulsars in this cluster is seven. Our initial timing shows that M5G is in a compact 2.7hr orbit period binary system with a low mass companion ( $\sim 0.02 M_{\text{sun}}$ ), indicating that M5G is likely to be in a black widow system. Therefore, immediate high sensitivity FAST follow-up observations could provide powerful diagnostics of the properties of new discovery and obtain very high precision timing solution for the existing previous known pulsars, thus shed new light into pulsar formation and evolution as well as the structure and dynamics of the GC.