## A search for the X-ray counterparts of the millisecond Pulsars in M28

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**Results:** A recent radio survey of globular clusters has increased the number of millisecond pulsars drastically. M28 is now the globular cluster with the third largest population of known pulsars, after Terzan 5 and 47 Tuc. This prompted us to revisit the archival Chandra data on M28 to check whether the newly discovered millisecond pulsars find a counterpart among the various X-ray sources detected in this GC previously. Indeed, the radio position of J1824-2452H is found to be in agreement with the position of CXC 182431-2452I7 while some faint unresolved X-ray emission near to the center of M28 is found to be coincident with the ma-pulsars PSR J1824-2452G, J1824-2452I, J1824-2452I and J1824-2452E.



## Left:

Chandra ACIS-S3 image of the central region of M28. The positions of the recently discovered new ms-pulsars are indicated by blue circles. Most are located within or near to the core-radius (dashed circle). The binary millisecond pulsar PSR J1824-2452H is in agreement with source #18 reported in Becker et al. (2003). There is faint (only partly resolved) emission near to the center of the cluster which is in agreement with the location of the new pulsars PSR J1824-2452J, J1824-2452I and J1824-2452E. The upper left inset helps to locate the different MSPs.

Name	Ra H:M:S	Dec D:M:S	P 10 <sup>-3</sup> s	Ė 10 <sup>34</sup> erg/s	<i>B</i> ⊥ 10 <sup>9</sup> G	ACIS-S net counts	rate cts/s
J1824-2452B	18 24 32.545	-24 52 04.29	6.5466		< 0.4	3	7.89e-5
J1824-2452E	18 24 33.089	-24 52 13.57	5.4191		< 0.8	5	1.32e-4
J1824-2452F	18 24 31.812	-24 49 25.03	2.4511	2.5198	< 0.5	1	2.63e-
		Binary pulsars:					
J1824-2452G	18 24 33.025	-24 52 17.32	5.90905	3.4228	< 1.6	17	4.47e-
J1824-2452H	18 24 31.591	-24 52 17.49	4.62941	3.2586	< 1.1	11	2.89e-
J1824-2452I	18 24 32.9	-24 52 12.00	3.93180			12	3.16e-
J1824-2452J	18 24 32.733	-24 52 10.18	4.03968		< 0.6	22	5.78e-
	Ecc	entric binary pu	lsars:				
J1824-2452C	18 24 32.192	-24 52 14.66	4.15828	9.3416	< 1.2	3	7.89e-
J1824-2452D	18 24 32,422	-24 52 25.90	79.8354	7.6183	~ 91.0	2	5.26e-

## Left:

Basic properties of the mspulsars located in the globular cluster M28 and their counting rates in Chandra ACIS-S data. The position of J1824-2452H is the Chandra X-ray position while for the other pulsars it is the radio timing position from Begin (2006).

For references and more details see: Becker et al. 2007 (astro-ph/07050119)