Young Radio Pulsars

Marta Burgay - OAC

The Cagliari Pulsar Group

- N. D'Amico, A. Possenti, M. Burgay, A. Corongiu
- Part of an international team (Italy, UK, USA, Australia, India)
- Aproved proposals @ Parkes, ATCA, GBT, GMRT, Arecibo

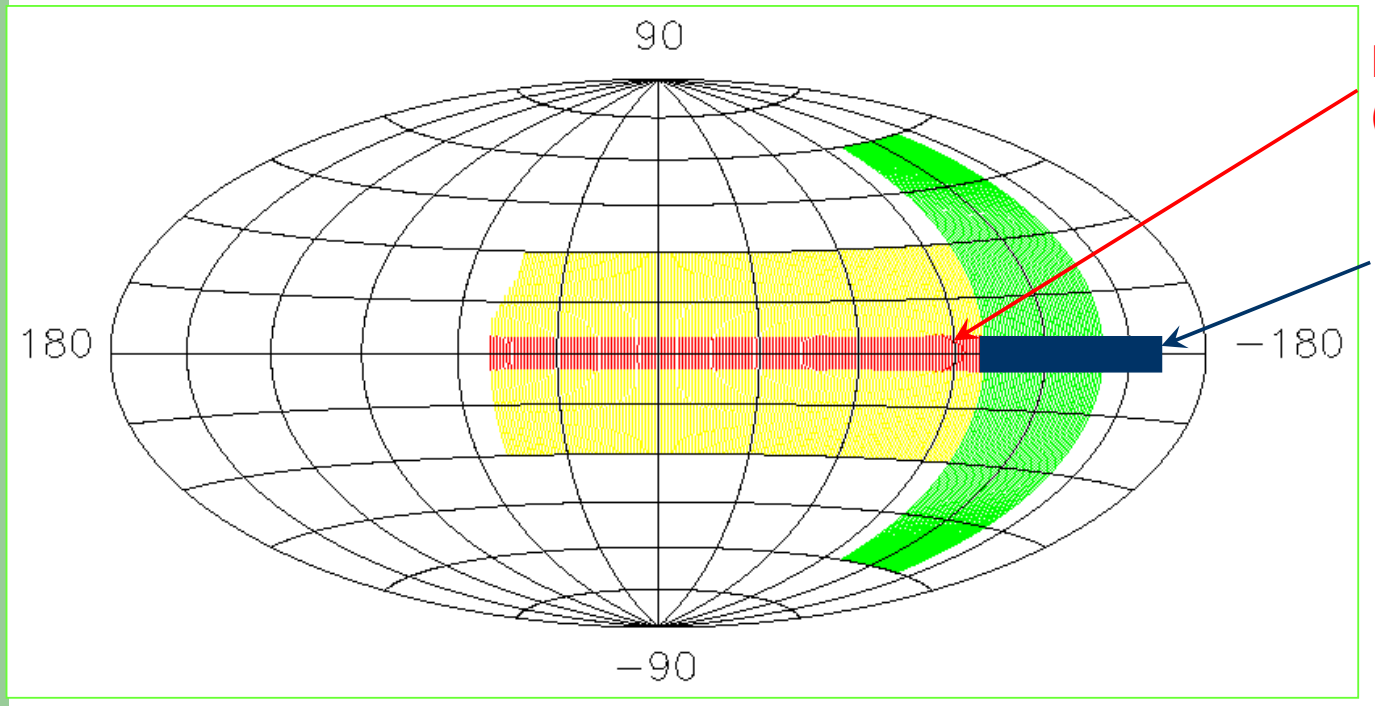
Where are Young Pulsars?

- Young pulsars evolve rapidly → low density → large distance
- Close to their place of birth (gal. plane)

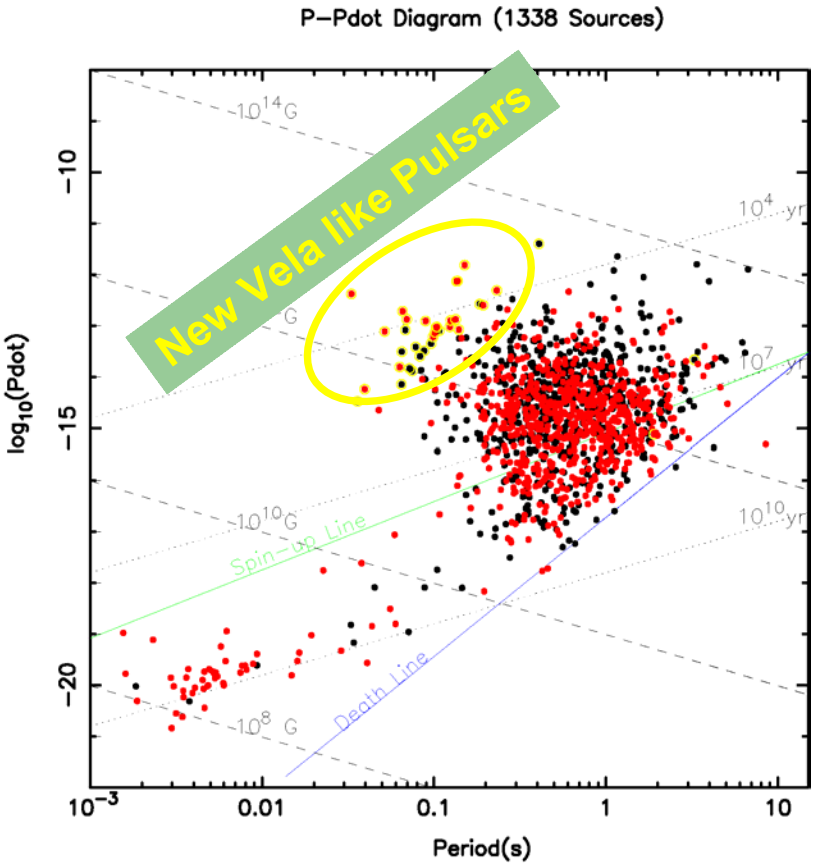
Deep Search of the Galactic Plane

The Parkes Multibeam Survey

- Survey of the galactic plane @1.4 GHz

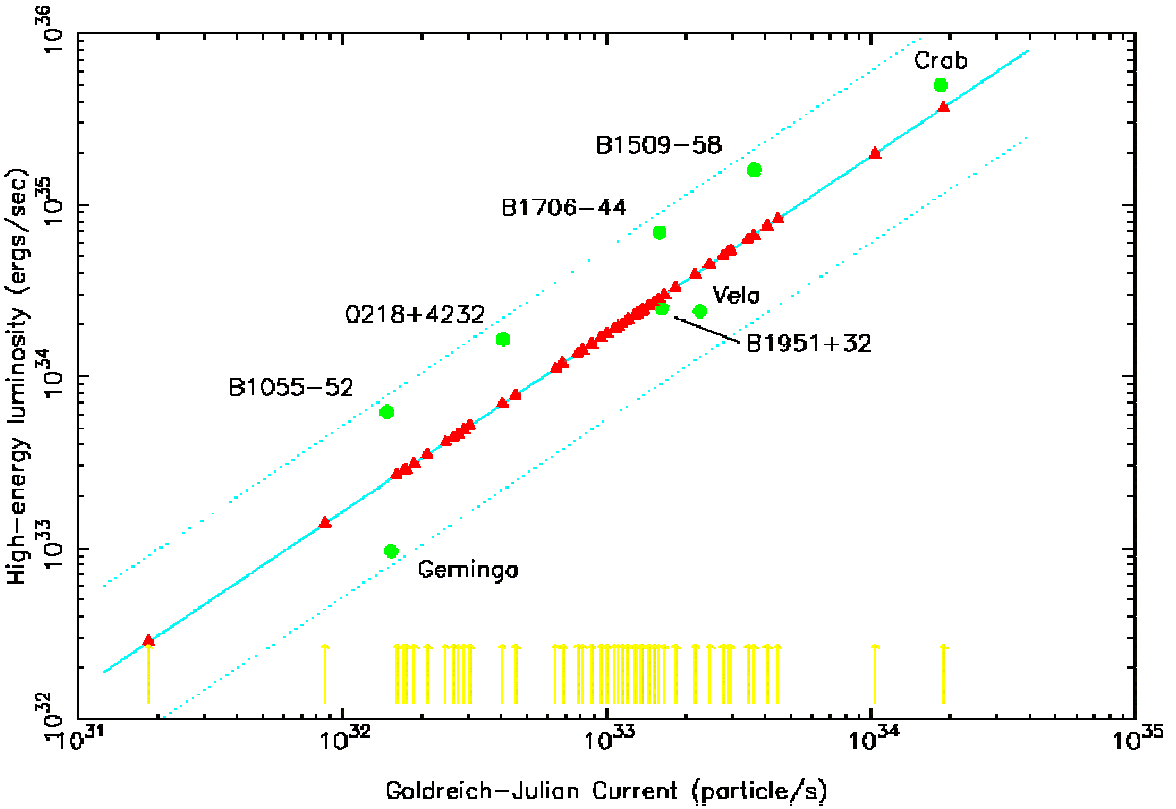


New Young and Energetic Pulsars

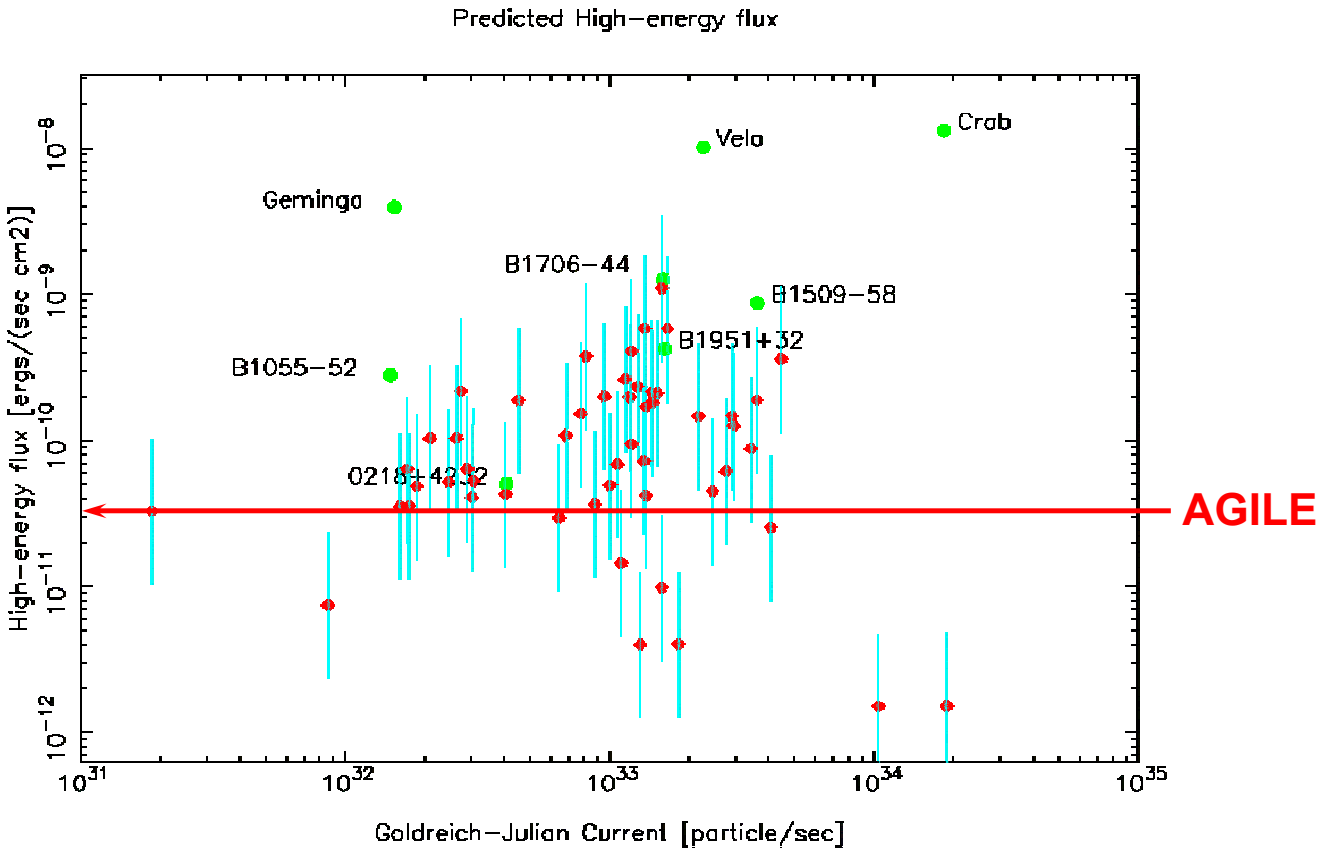


More than 700 new pulsars!

Gamma-Rays


Crab
B1509−58
B1706−44
Vela
0218+4232
B1951+32
B1055−52
Geminga
High−energy luminosity (ergs/sec)
Goldreich−Julian Current (particle/s)
10^{36}
10^{35}
10^{34}
10^{33}
10^{32}
10^{31}
10^{32}
10^{33}
10^{34}
10^{35}

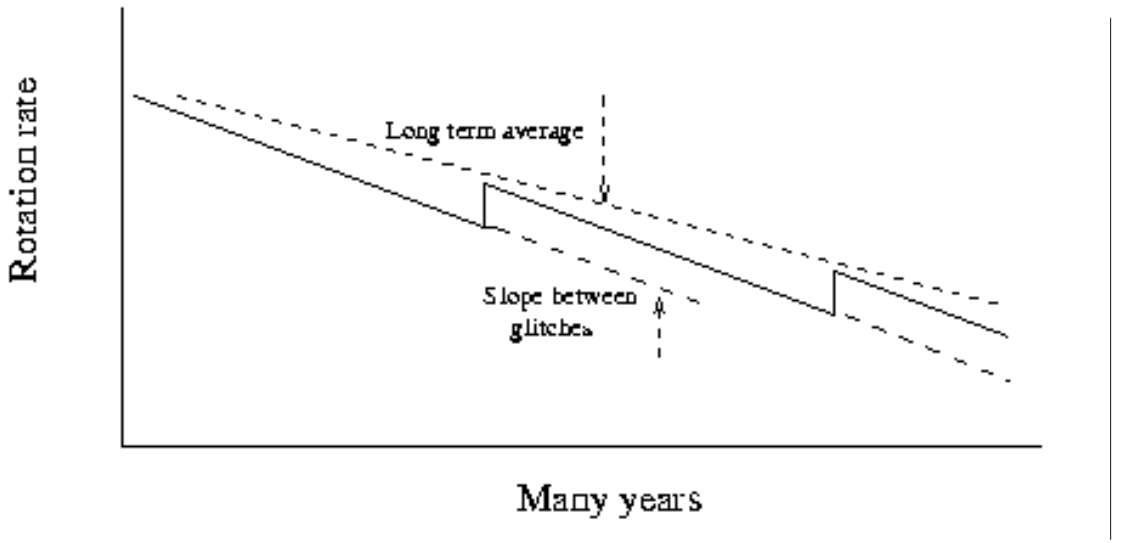
Gamma-Rays


Predicted High−energy flux
Crab
Vela
Geminga
B1706−44
B1509−58
B1951+32
B1055−52
0218+42.2
AGILE
High−energy flux [ergs/(sec cm2)]
Goldreich−Julian Current [particle/sec]

Radio and Gamma-Ray Pulsars

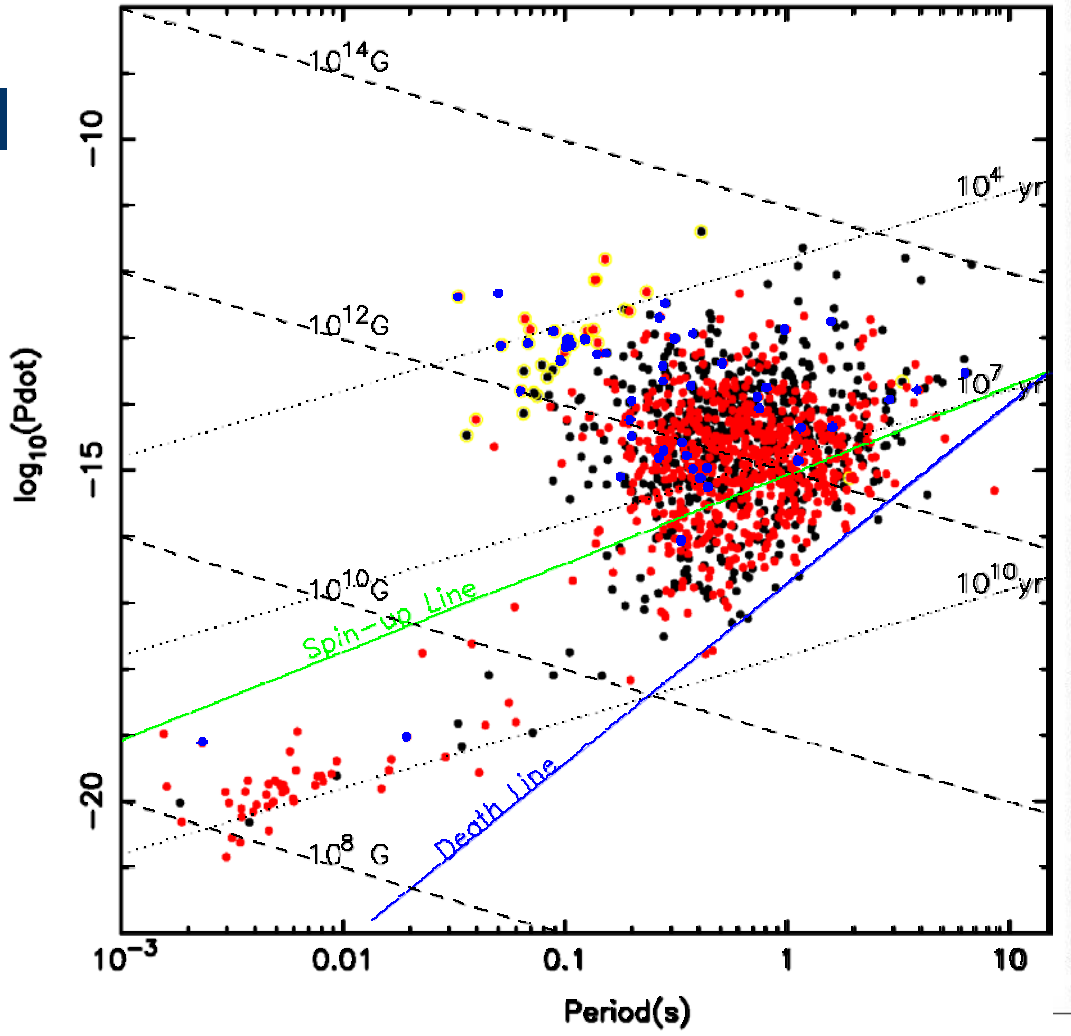
- Timing capabilities of AGILE allow e.g. to search for pulsations from known radio pulsars
- It is hence necessary to have precise pulsar timing from radio observations

Timing instabilities



What can we do for AGILE?

- We can give LOCAL timing solutions!
- Keep monitoring young pulsar in radio
  - Parkes glitching pulsars programme
  - Jodrell Bank long term monitoring
  - SRT (starting from 2007)



3EG J	PSR	$\Delta\Phi/\theta_{95}$	$\log[\dot{E}\ (\mathrm{erg\ s^{-1}})]$	Assoc	Surv
0222+4253	J0218+4232	0.93	35.38	+	-
0500−0159	J0459−0210	0.30	31.60	–	-
0533−6916	B0540−69	1.09	38.12	–	-
	J0535−6935	0.64	34.60	–	-
0534+2200	B0531+21	1.23	38.64	+	-
0834−4511	B0833−45	3.72	36.84	+	-
1013−5915	B1011−58	0.41	33.11	–	-
		0.45	32.48	–	pksmb
		0.67	36.42	+?	pksmb
		0.44	35.92	+?	pksmb
		0.90	36.30	+	-
		0.66	34.48	+	-
		0.37	33.54	–	-
		0.62	36.40	+	-
		1.00	31.30	–	pksmb
		0.41	35.08	–	pksmb
		0.75	35.75	?	pksmb
		0.53	37.00	+?	pksmb
		0.79	33.43	–	pksmb
		0.52	34.08	–	-
		0.83	35.81	?	pksmb
		0.81	32.00	–	pksmb
		0.46	33.56	–	pksmb
		0.65	33.75	–	pksmb
		0.71	33.52	–	pksmb
		2.26	36.52	+	-
		0.59	33.23	–	pksmb
		0.48	34.84	–	pksmb
		0.67	30.60	–	pksmb
		0.84	31.00	–	-
		0.84	32.70	–	-
		0.89	34.61	–	-
		0.77	31.60	–	pksmb
		0.38	32.90	–	pksmb
		0.75	32.90	–	pksmb
		1.17	36.46	?	-
		0.55	33.18	–	-
		0.98	34.92	–	pksmb
		0.74	34.20	–	pksmb
		0.90	36.30	+?	pksmb
		0.88	32.00	–	-
		0.30	35.63	?	-
		0.39	33.08	–	-
		0.31	34.15	–	pksmb
		0.75	32.60	–	pksmb
		0.88	33.74	–	pksmb
		1.38	36.53	+?	-
		0.56	37.34	+	-