# On the connection of soft gamma-repeaters with short duration GRBs

A. Pozanenko[1],V. Loznikov[1], R. Preece[2]

[1]Space Research Institute, Moscow

[2]Department of Physics, UAH, Huntsville

While the idea of the connection of Soft Gamma-Repeaters (SGRs) with short duration Gamma-Ray Bursts (GRBs) was first discussed more than 20 years ago [1], no direct evidence has been obtained yet. Nevertheless, several cases of indirect evidence may still be considered. Among these are: the apparently different population of short bursts based on the bi-modal GRB duration distribution [2]; the difference in hardness between the two populations [3]; and the absence of any optical counterpart for short events [4]. The Giant Flare (GF) of SGR1806–20 on December 27, 2005 raised the possibility of the connection by adding new details [5–7]. Indeed, this GF could have been detected by BATSE if the source of SGR1806–20 were placed as far away as at 30 – 50 Mpc [7, 8], taking the actual distance to SGR1806–20 to be 15 kpc. However, only the direct observation of a distant SGR (i.e., a GF of a distant SGR accompanied by a pulsating tail) can provide an evidence for the direct connection between SGRs and short GRBs.

In the paper we analyze time histories of the gamma-ray “background” immediately after short duration BATSE Gamma-Ray Bursts ($T_{90} < 2$ s) to search for pulsating tail of these bursts and to find a possible connection between short GRBs and Giant Flares of Soft Gamma-Repeaters. At least in one case of GRB930905 we found a significant pulsating tail with a period of $P = 6.43 \pm 0.16$ s. No bright galaxies were found in a small GRB error box restricted by the IPN annulus and the BATSE error box. The details of data analysis and a possible scenario for the population of short duration GRBs are discussed.

## References

[1] Mazets, E.P., Golenetskii, S.V., Gurian, Iu.A., et al. ApSS, 84, 173 (1982).
[2] Kouveliotou, C., et al. ApJ, 413, L101 (1993).
[3] Dezalay, J.-P. et al. ApJ, 471, L27 (1996).
[4] Hurley, K. et al. ApJ, 567, 447 (2002).
[5] Boggs, S. et al. GCN Circ. No. 2936 (2004).
[6] Mazets, E.P., Cline T.L., Aptekar R.L., et al. astro-ph/0502541 (2005).
[7] Hurley, K., Boggs, S. E., Smith, D. M. et al. Nature 434, 1098, (2005).
[8] Nakar, E., Gal-Yam, A., Piran, T., et al. astro-ph/05002148 (2005).