A Fast Radio Burst Host Galaxy

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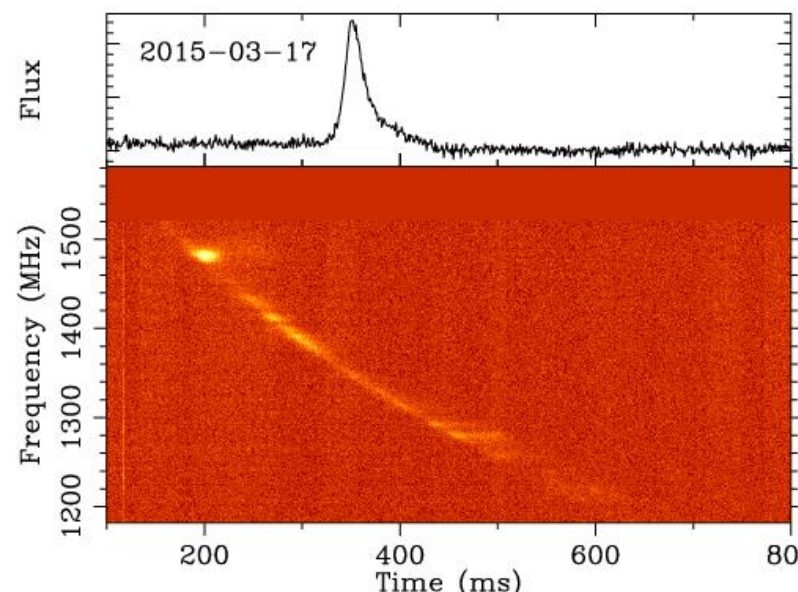
- Parkes Radio Astron. Observatory
- SUrvey for Pulsars and Extragalactic Radio Bursts (SUPERB) project (слепой поиск)
- 15 апреля 2015 – наблюдалась радиовспышка (fast radio burst) на 1382MHz. Продолжительность менее 8msec
- Its dispersion measure (DM) is 776 cm^{-3} pc, which is 4.1 times the maximum Galactic contribution expected from this line of sight through the MilkyWay.



Что было раньше?
Что такое перитон?

Identifying the source of perytons at the Parkes radio telescope

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ABSTRACT

"Perytons" are millisecond-duration transients of terrestrial origin, whose frequency-swept emission mimics the dispersion of an astrophysical pulse that has propagated through tenuous cold plasma. In fact, their similarity to FRB 010724 had previously cast a shadow over the interpretation of "fast radio bursts," which otherwise appear to be of extragalactic origin. Until now, the physical origin of the dispersion-mimicking perytons had remained a mystery. We have identified strong out-of-band emission at 2.3–2.5 GHz associated with several peryton events. Subsequent tests re-

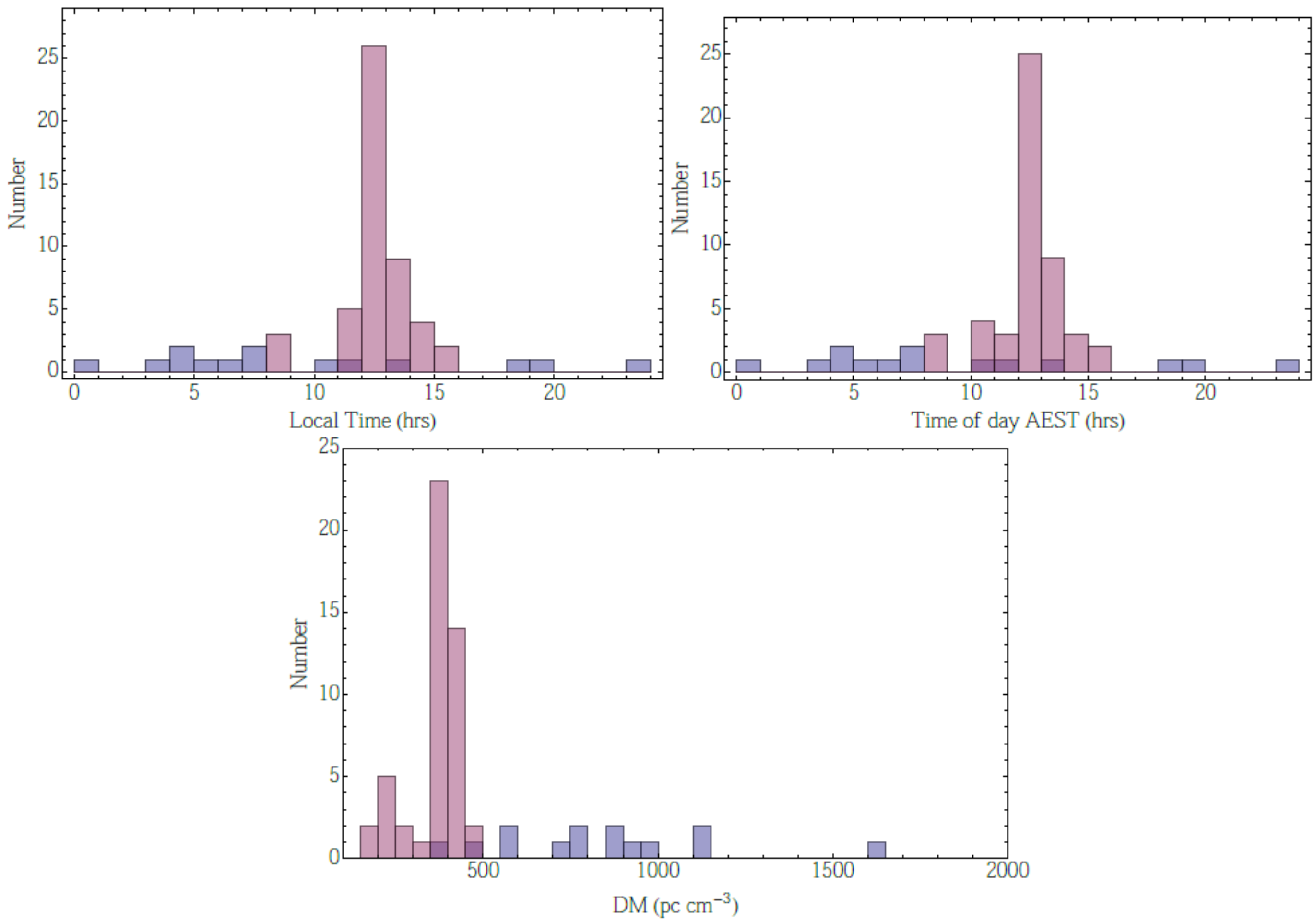

Figure 7. The FRB (blue) and peryton (red) distributions as a function of the local time with Australian Eastern Daylight Savings Time accounted for (top left), time in Australian Eastern Standard Time (top right) and as a function of DM over the entire range searched (bottom). Clearly the FRB distribution is uniform throughout the day, whereas the peryton signals peak strongly during office hours (particularly around lunch time). A random distribution would look approximately flat, with a slight dip during office hours where occasional maintenance is carried out. The bi-modal peryton distribution with peaks at ~ 200 and ~ 400 cm^{-3} pc is evident.

Результаты обследования

- В начале апреля 2015 года был продемонстрирован процесс создания «Перитонов» при помощи нарушения правил эксплуатации двух микроволновых печей, расположенных в обсерватории (на кухне для сотрудников и в помещении для посетителей). При определенных положениях телескопа и досрочном открытии дверцы работающей печи с вероятностью 1/2 возникал сигнал «Перитон»

- Australia Telescope Compact Array (ATCA) were carried out at 5.5 and 7.5 GHz – через 2 часа после вспышки. Затухающий радиоисточник.
- 8.2-m Subaru Telescope on 2015 April 19 and April 20. From these images, we identify a source within the 1 arcsec positional uncertainty derived from the ATCA image (Figure 3).
- E-галактика с z=0.49. $\mathrm{SFR} \lesssim 0.2\ \mathrm{M_\odot\ yr^{-1}}$

- $DM_{IGM} = DM_{FRB} - DM_{MW} - DM_{halo} – DM_{host}/(1 + z)$

$$\Omega_{\mathrm{IGM}} = \left(\frac{0.88}{f_{\mathrm{e}}}\right) 0.049 \pm 0.013$$

СОВПАДАЕТ С ОЖИДАЕМЫМ!

Based on these facts, unresolved FRB 150418-like events might be asrcibed to cataclysmic events (such as short-GRBs), while FRB 110523-like events, where the intrinsic timescale is 1 ms, could be associated to magnetar flares.

Cold Milky Way HI gas in filaments

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Received ______________________; accepted ______________________

We investigate data from the Galactic Effelsberg–Bonn HI Survey (EBHIS), supplemented with data from the third release of the Galactic All Sky Survey (GASS III) observed at Parkes. We explore the all sky distribution of the local Galactic HI gas with $|v_{\rm LSR}| < 25$ km s^{-1}on angular scales of $11'$ to $16'$. Unsharp masking (USM) is applied to extract small scale features. We find cold filaments that are aligned with polarized dust emission and conclude that the cold neutral medium (CNM) is mostly organized in sheets that are, because of projection effects, observed as filaments. These filaments are associated with dust ridges, aligned with the magnetic field measured on the structures by *Planck* at 353 GHz. The CNM above latitudes $|b| > 20°$ is described by a log-normal distribution, with a median Doppler temperature $T_{\rm D} = 223$ K, derived from observed line widths that include turbulent contributions. The median neutral hydrogen (HI) column density is $N_{\rm HI} \simeq 10^{19.1}$ cm^{-2}. These CNM structures are embedded within a warm neutral medium (WNM) with $N_{\rm HI} \simeq 10^{20}$ cm^{-2}. Assuming an average distance of 100 pc, we derive for the CNM sheets a thickness of $\lesssim 0.3$ pc. Adopting a magnetic field strength of $B_{\rm tot} = (6.0 \pm 1.8)\mu$G, proposed by Heiles & Troland 2005, and assuming that the CNM filaments are confined by magnetic pressure, we estimate a thickness of 0.09 pc. Correspondingly the median volume density is in the range $14 \lesssim n \lesssim 47$ cm^{-3}.

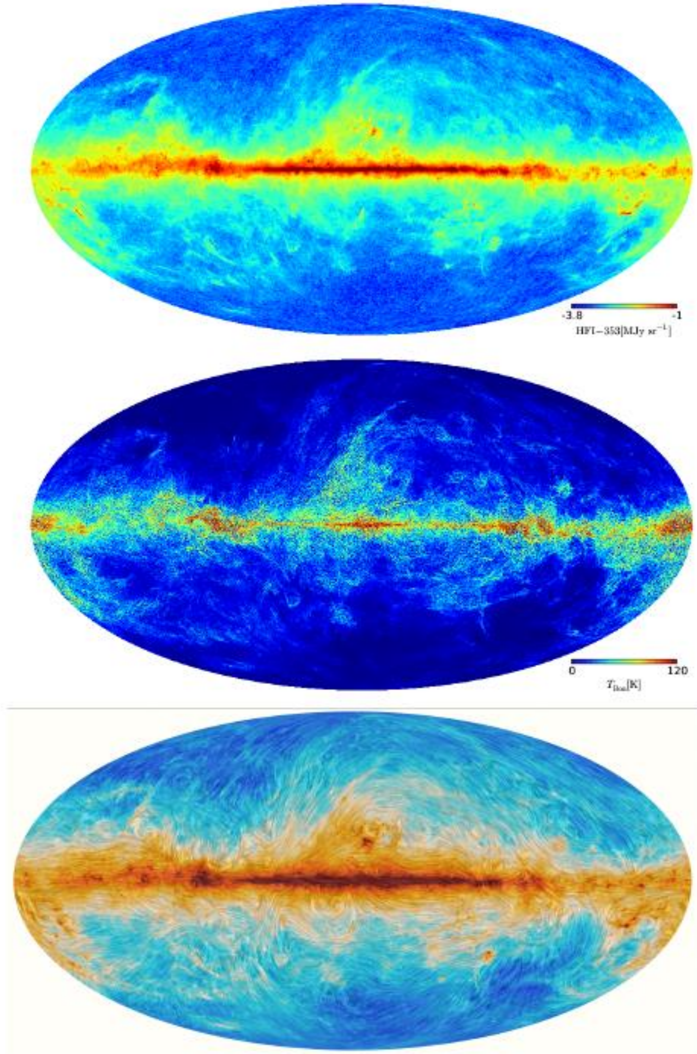

Fig. 2.— *Top: Planck* HFI Sky Map at 353 GHz (MJy sr^{-1}). To cover the high dynamic range we use a logarithmic look-up table. *Middle:* all sky brightness temperature map $T_{\rm Bon}$ of major local HI filaments (K) observed by us. *Bottom:* All-sky view of the magnetic field and total intensity of dust emission measured by *Planck* as published by ESA 05/02/2015. The colors represent intensity. The texture is based on measurements of the direction of the polarized light emitted by the dust, which in turn indicates the orientation of the magnetic field.

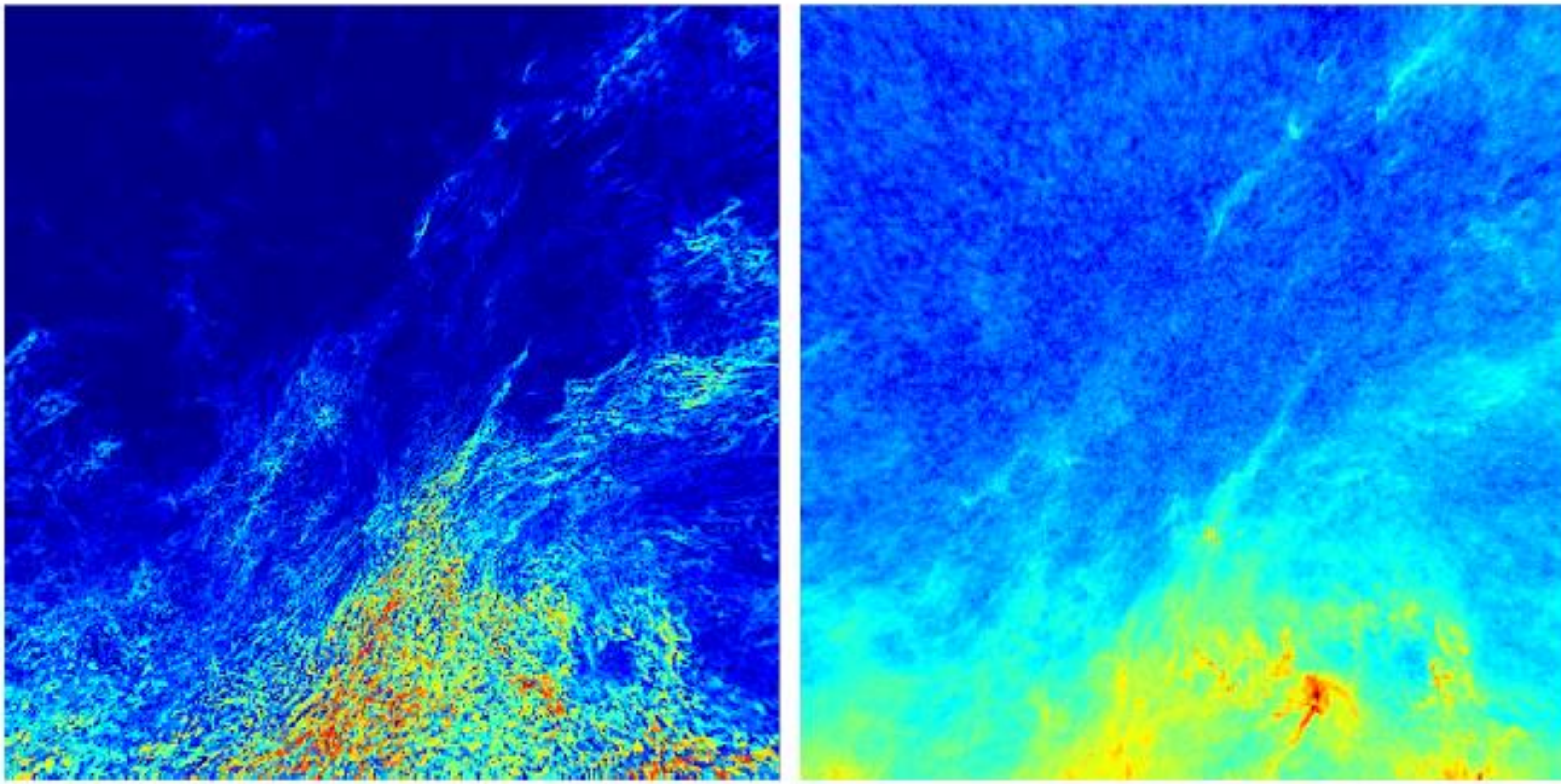

Fig. 3.— Zoom in only for a visual comparison between major Hɪ filaments (left) and the *Planck* HFI dust emission at 353 GHz. Both maps are centered at $l = 10°$, $b = 60°$ and display about $100° \times 100°$ in gnomonic projection.

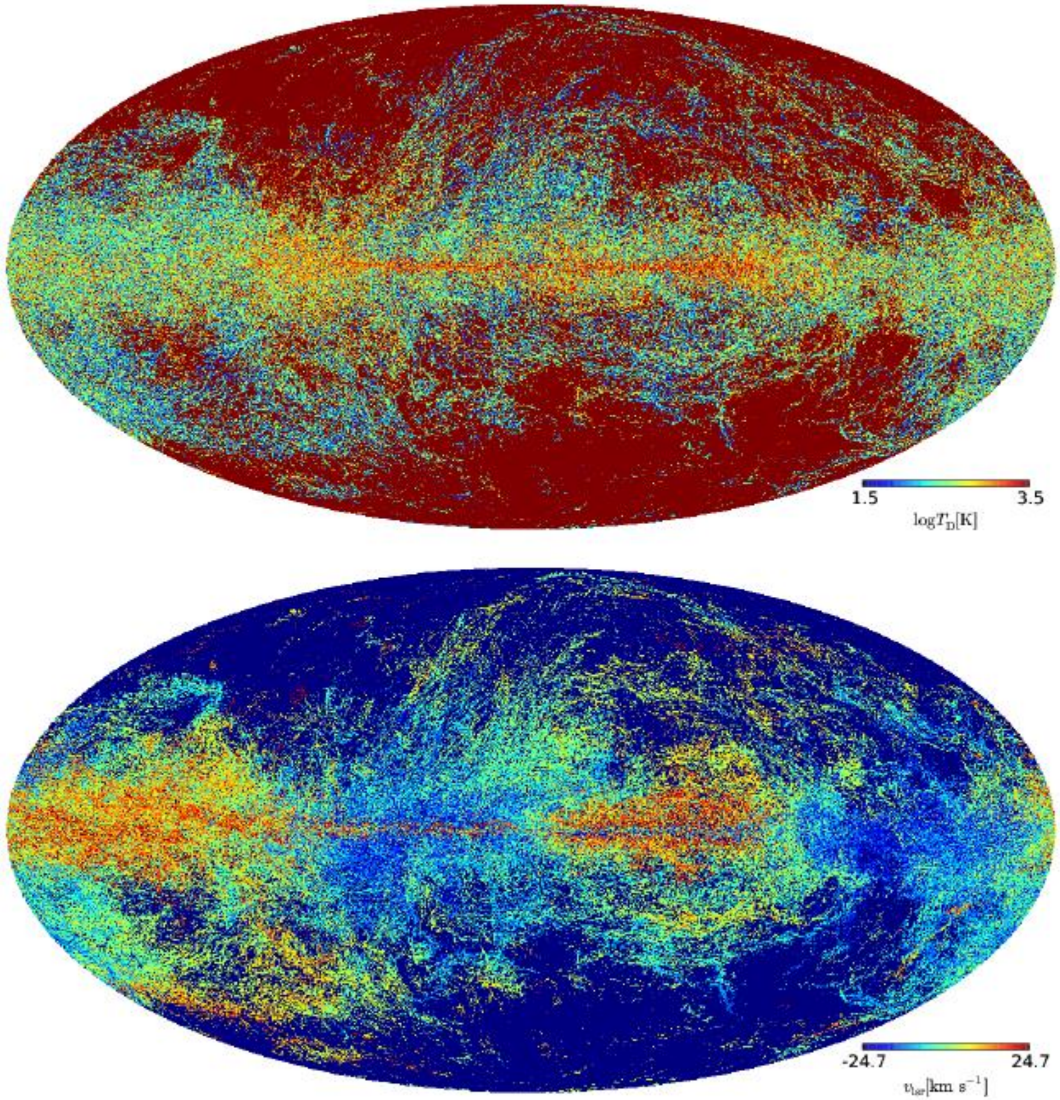

Fig. 6.— Derived properties for the major HI filaments, continued. *Top:* Doppler temperatures ($\lg(T_{\rm D})$) and at the bottom the velocity field of the filaments (km s^{-1}). See text for a detailed description.