

The GMRT ARChIve Atomic gas survey (GARCIA)-I. Survey definition, methodology and initial results from the pilot sample

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Сборка всего возможного из архива GMRT:

HI surveys of nearby galaxies have been performed in the past; however, most of them consist of less than 100 galaxies due to individual efforts. On the other hand, present-day archives of the radio telescopes include data for at least several hundred galaxies. To utilize these data sets to their full potential, we construct a sample including all galaxies observed by the Giant Meter wave Radio Telescope (GMRT) in HI. This results in a total of 515 galaxies, the largest sample to date. We intend to analyze all the data uniformly and carry out different exciting science. As a pilot project,

Хорошее введение (оболочки THINGS, 3D kinematics models...)

Картографические обзоры близких галактик на 21 см:

WHISP – 148 spirals, THINGS – 20 dwarf galaxies

Здесь: GMRT L-band (~7 km/s channel width),

обещают сделать общедоступную базу обработанных кубов и карт:

external galaxies(G), pair of galaxies(M2), Triple galaxies(M3), multiple galaxies(M), group of galaxies(MG) and galaxy clusters(MC).

$z < 0.07$ (– что бы достаточно разрешать диски для 3D моделей) , $b > 10$ deg

=> 515 галактик (всего 561 – 46 эллиптических почти без газа)

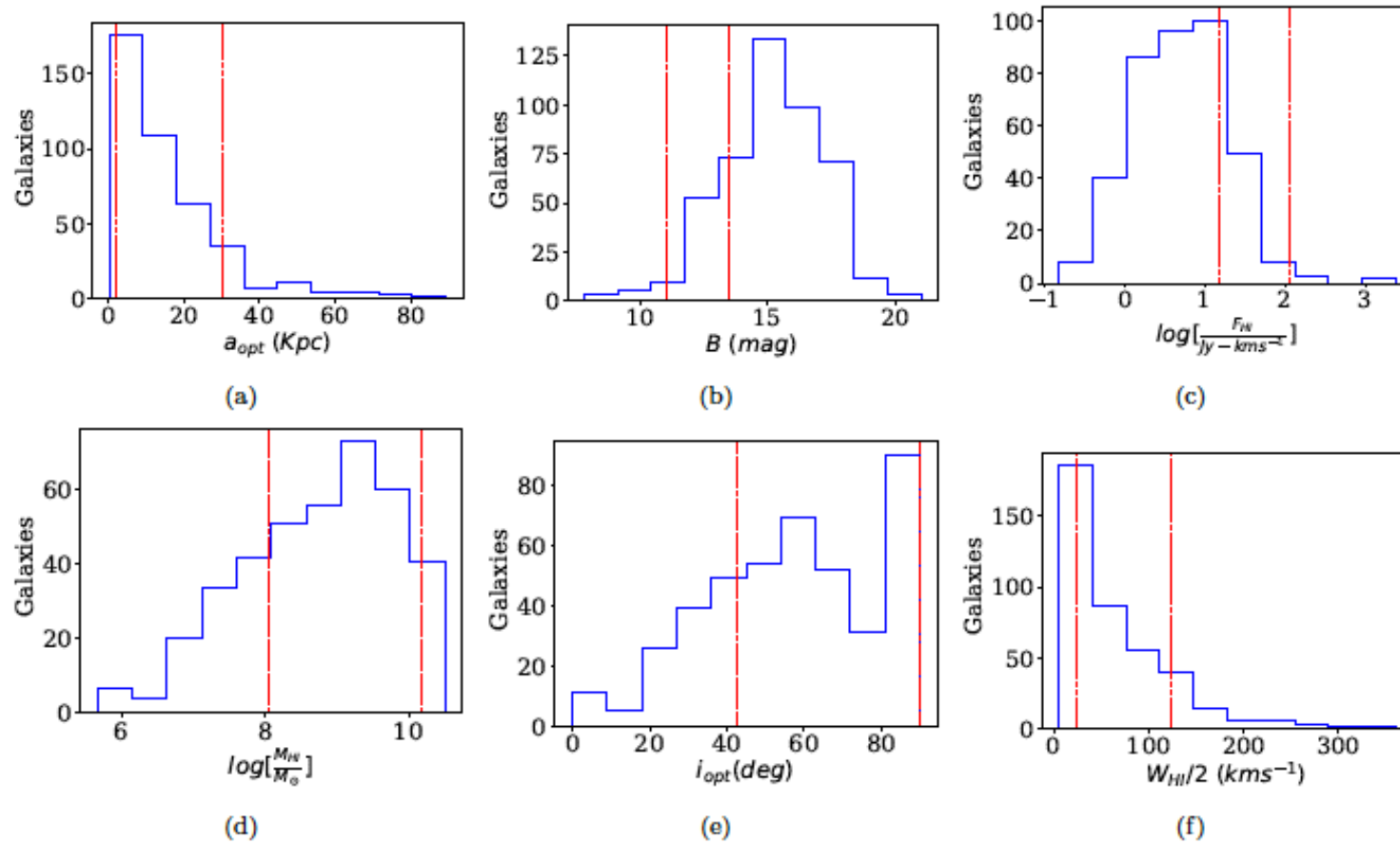
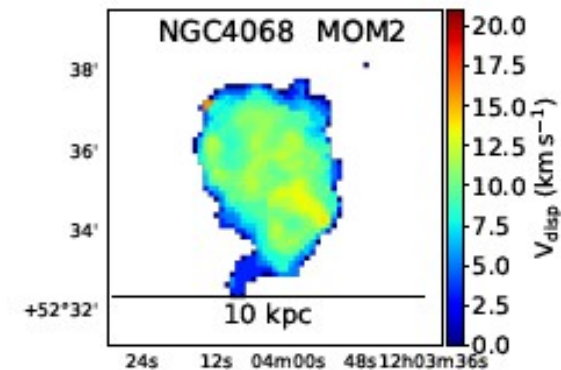
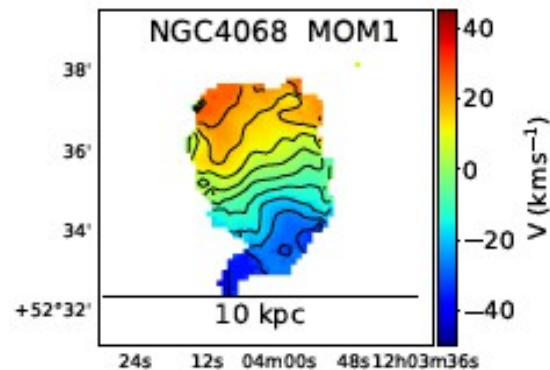
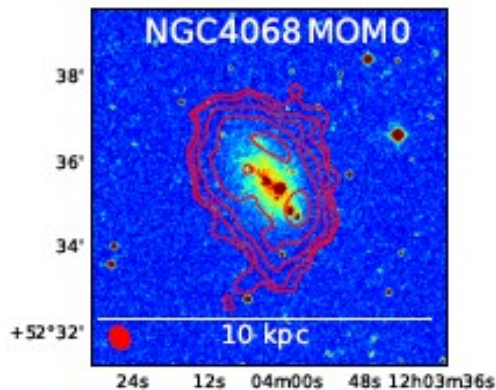
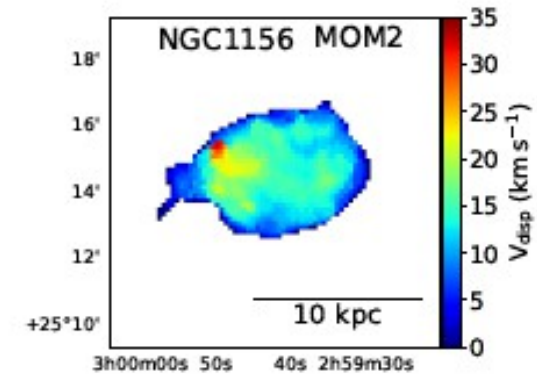
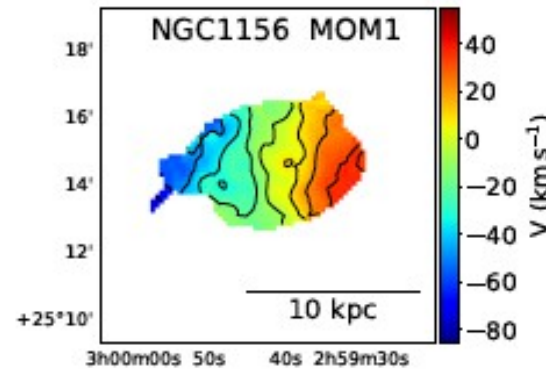
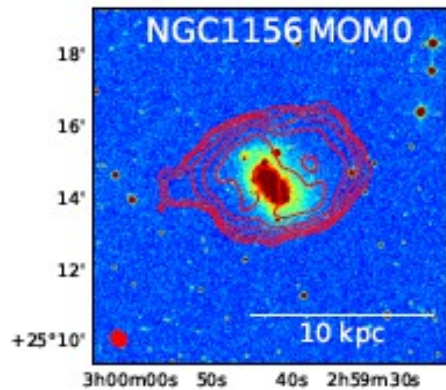


Figure 3. The distributions of different parameters of the sources. From left-to-right and then top-to-bottom, the x-axis represents respectively the optical diameter (a_{opt}) in Kpc, B-band magnitude (B), HI line flux ($\log[\frac{F_{HI}}{Jy - Kms^{-1}}]$), HI mass ($\log[\frac{M_{HI}}{M_{\odot}}]$), optical inclination angle (i_{opt}) and the width of the HI spectra ($W_{HI}/2$). The red dashed lines represent the range of the respective parameters for the selected sub-sample.

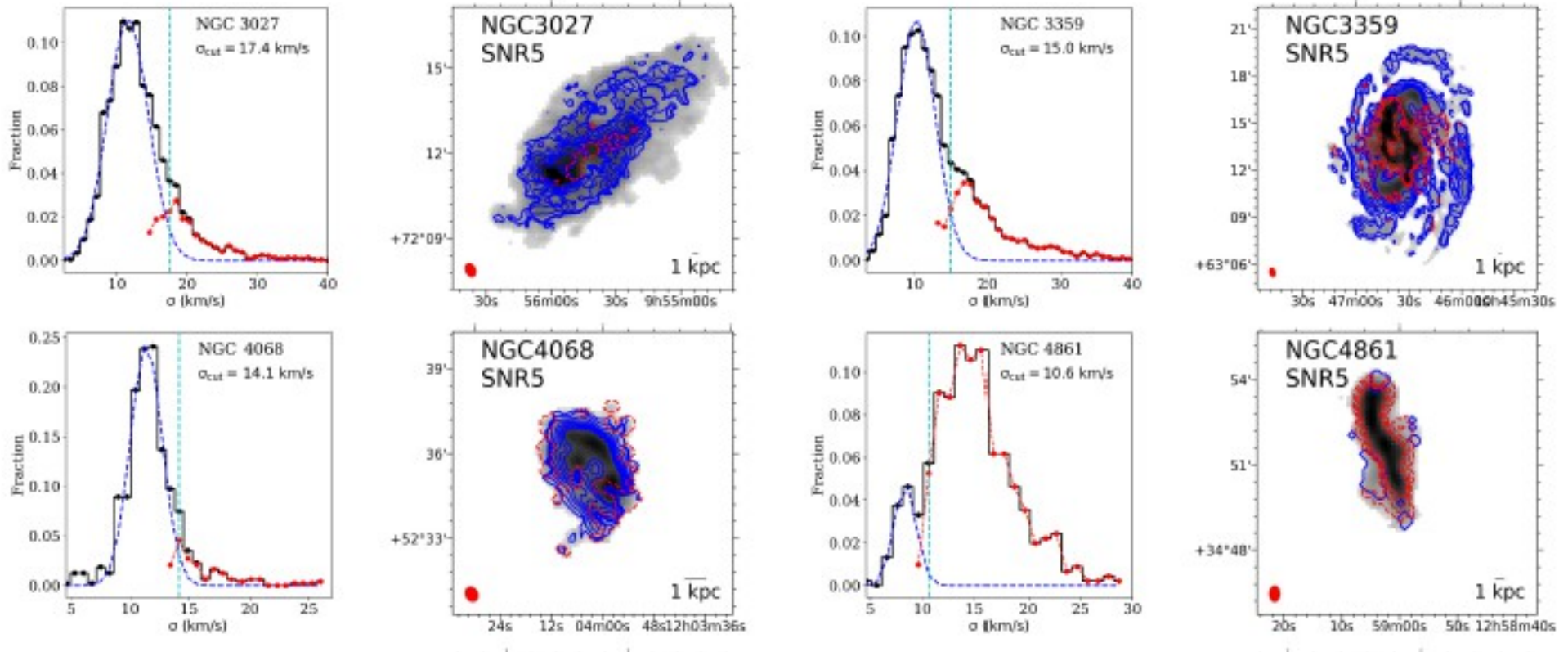
Здесь пока – пилотная выборка из 11 галактик для иллюстрации метода

Galaxy name	$W_{m50}/2$ (km s ⁻¹)	$W_{p20}/2$ (km s ⁻¹)	Line flux (Jy kms ⁻¹)	M_{HI} (M _⊙)
NGC 0784	60.7	61.025	60.5 ± 0.8	$(4.22 ± 0.06) × 10^8$
NGC 1156	56.74	53.755	49.7 ± 0.6	$(5.38 ± 0.07) × 10^8$
NGC 3027	110.71	112.365	80.2 ± 0.9	$(5.14 ± 0.06) × 10^9$
NGC 3359	128.71	131.405	150.8 ± 1.1	$(9.95 ± 0.07) × 10^9$
NGC 4068	38.025	38.495	28.4 ± 0.8	$(1.284 ± 0.035) × 10^8$
NGC 4861	55.815	57.685	39.3 ± 1.0	$(9.12 ± 0.22) × 10^8$
NGC 7292	45.875	47.545	19.1 ± 0.5	$(4.13 ± 0.11) × 10^8$
NGC 7497	144.835	148.345	55.0 ± 0.7	$(5.05 ± 0.06) × 10^9$
NGC 7610	128.23	132.545	30.4 ± 0.8	$(1.56 ± 0.04) × 10^{10}$
NGC 7741	99.635	103.465	41.3 ± 0.8	$(1.536 ± 0.031) × 10^9$
NGC 7800	108.72	114.045	37.4 ± 0.9	$(3.69 ± 0.08) × 10^9$



Многокомпонентные гауссианы для выделения холодной (узкой) и теплой (широкой) ISM

Бимодальность в распределении ширин:



DATA AVAILABILITY

All data used in this study are available publicly from the GMRT online archive. All reduced data (low and high-resolution images, rotation curve, spectra) will be made available for the entire sample in a phased manner. All reduced data from the current sub-sample will be shared at reasonable request to the corresponding author.