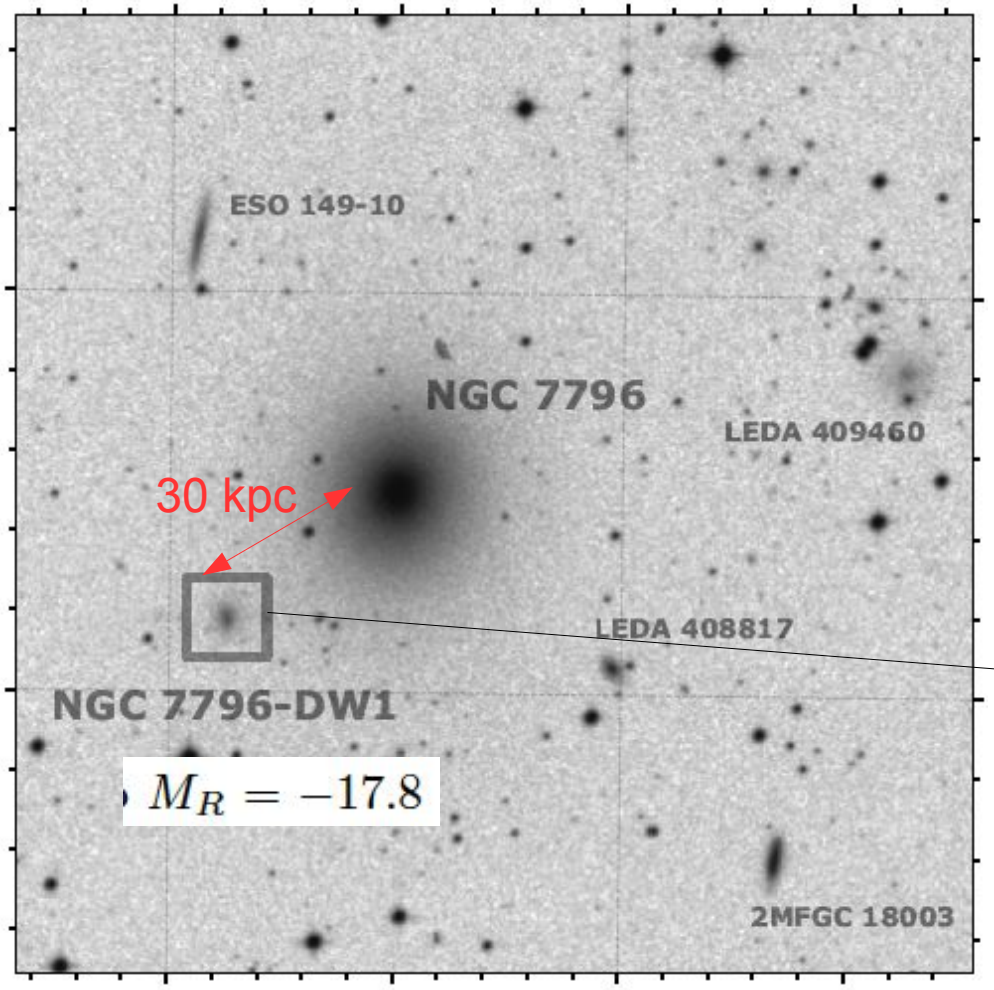
The curious case of the companion: evidence for cold accretion onto a dwarf satellite near the isolated elliptical NGC 7796

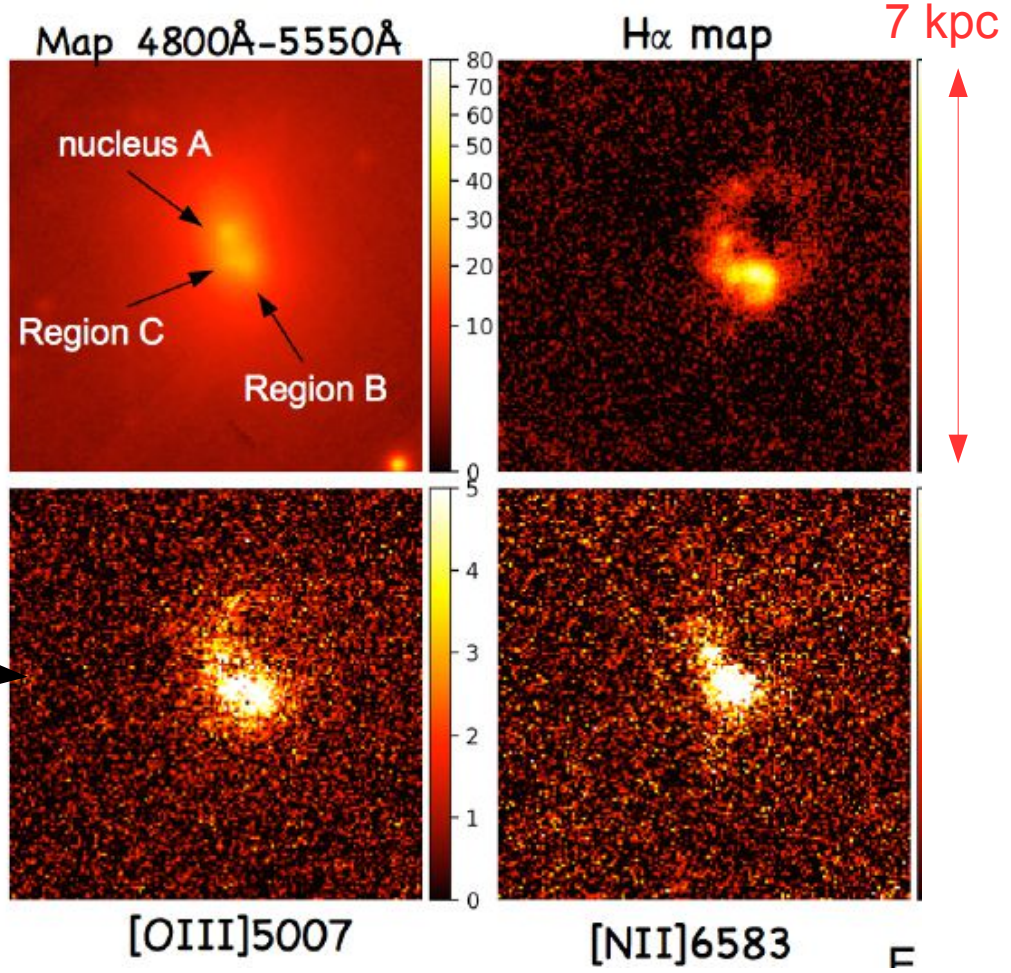
Richtler et al.

arXiv:1809.08964

IE=Isolated elliptical galaxy
IEs in fact may have many dwarf companions...



MUSE maps:



Только A – настоящее ядро

A – старое, B&C – моложе и металличнее

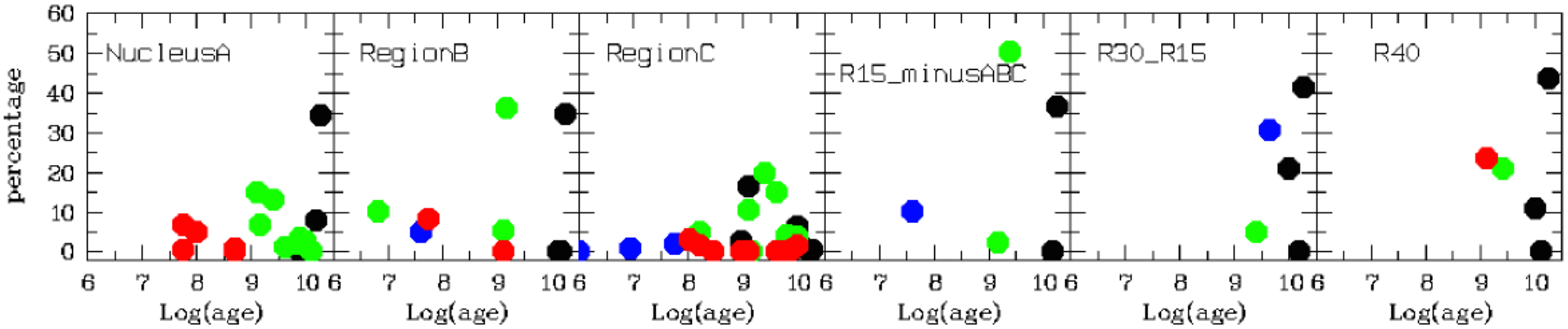


Fig. 3. These graphs show typical results of a STARLIGHT decomposition for our characteristic spectra. Indicated is the population composition in percentage of light at 5650 Å of all populations involved in the fit. The colours denote metallicities. Black: z=0.0004; blue: z=0.008, green: z=0.02, red: z=0.05. The individual uncertainties, particularly those

Тоже и в газе (2-B, 3-C – металличность близка к солнечной)

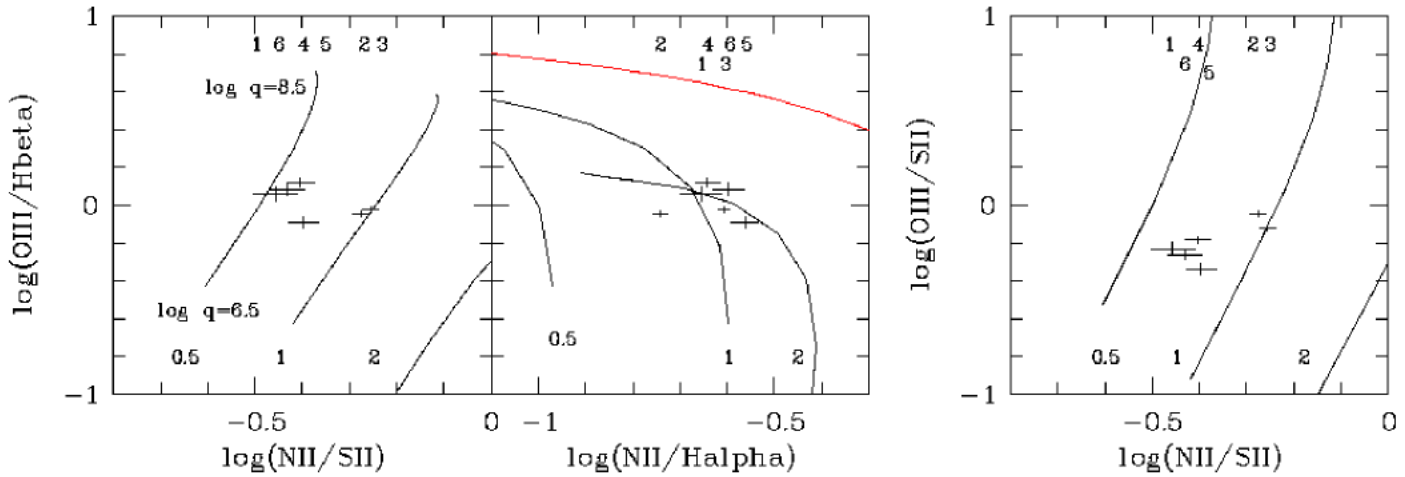


Fig. 4. Diagnostic graphs for our six characteristic spectra. These line ratios are compared to HII-region models from Dopita et al. (2013) (for a Boltzmann distribution of electrons) with the ionisation parameter log (q) and three oxygen abundances in solar units (0.5, 1, 2) as parameters. The solid lines are lines of constant abundance and varying log (q).

One concludes that the ionising sources must be an OB-star population that is unresolved....

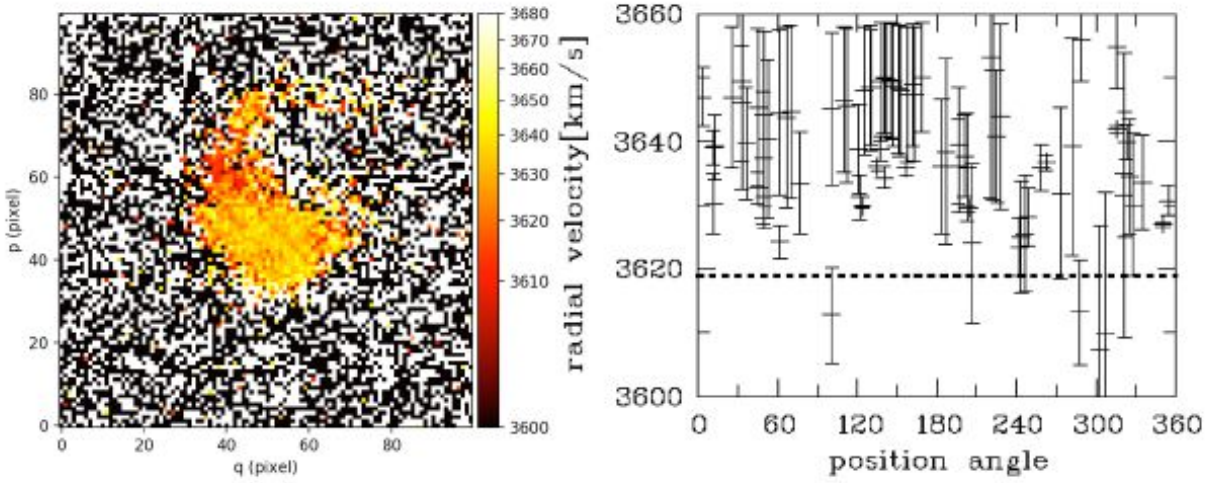


Fig. 5. Left panel: Hα radial velocity map. Right panel: radial $H\alpha$ velocities vs. position angle along the ring. These extractions overlap slightly and give velocities also in the regions of low surface brightness. The horizontal dotted line is the stellar radial velocity of spectrum 5, assumed to be the systemic velocity. A rotation signal is not apparent.

Вращается ли кольцо – не очень-то и ясно, но системная скорость отилчается от звезд

Сценарий мержинга гне очень нравится – где взять такую высокометаличную галактику для столкновения и куда она делась потом?

=> аккреция охлажденного газа из гало NGC 7796 (X-ray bright)

The aftermath of the Great Collision between our Galaxy and t Large Magellanic Cloud

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MW is atypical:
- an undersized SMBH
- a very low mass, metal-poor stellar halo;
- an unusually large nearby satellite galaxy

Но все эти проблемы решатся через 2 млрд лет, так как БМО на курсе столкновения:

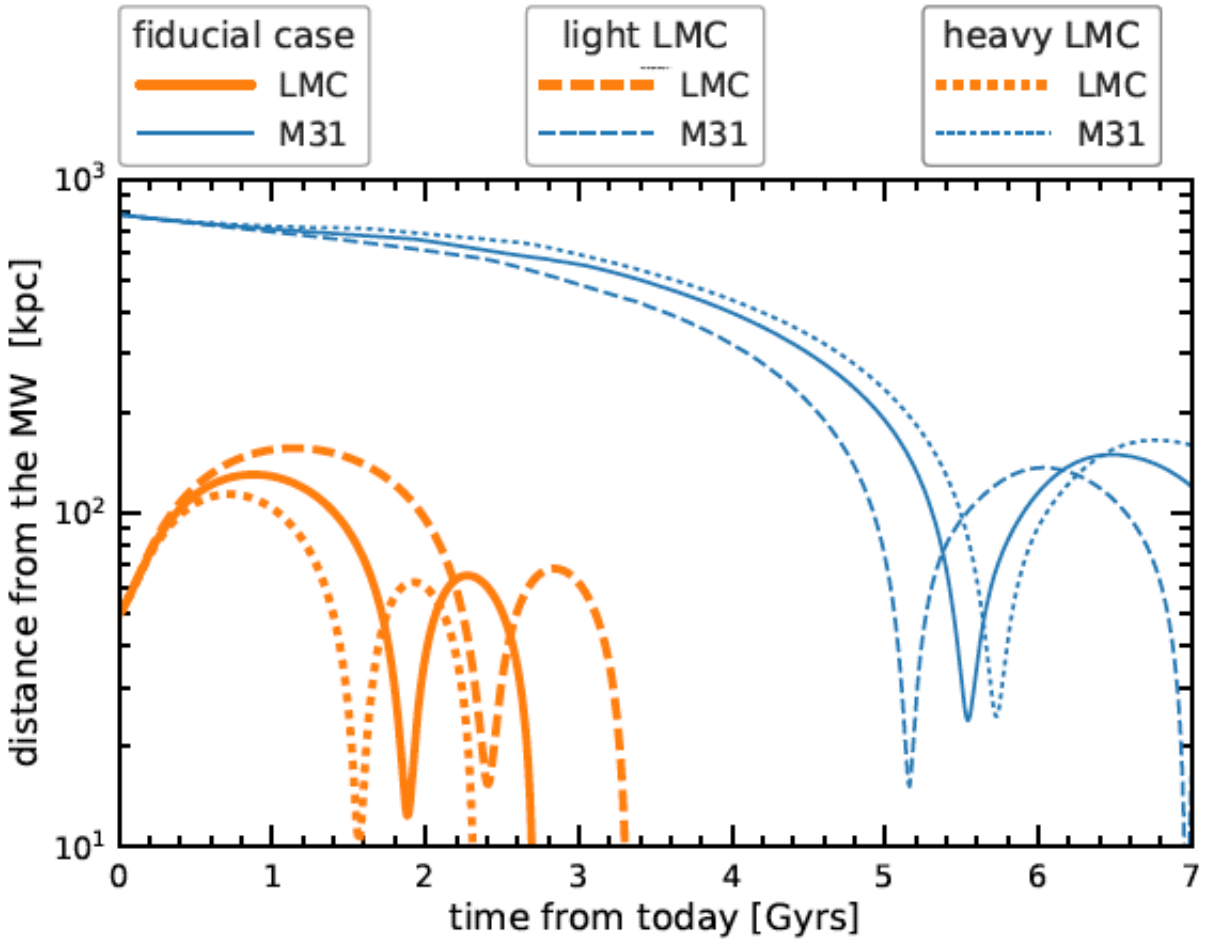
it will merge in $2.4^{+1.2}_{-0.8}$ Gyrs (68% confidence level).

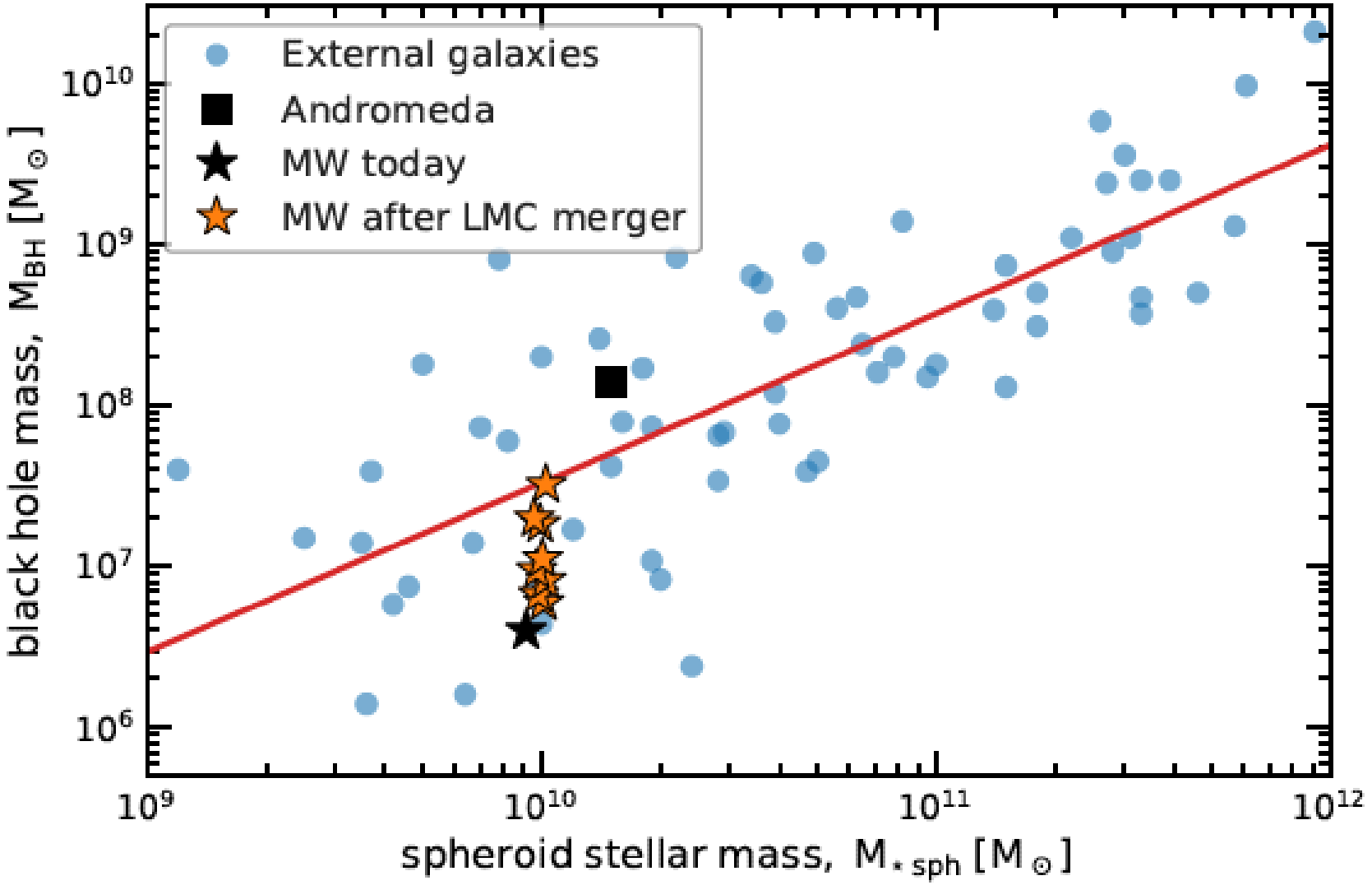
- SMBH вырастет в 1.5-8 раз!
- металличность гало будет как в БМО [Fe/H]=-0.5
- а БМО просто не будет :)

We use a semi-analytic model of the orbital dynamics of the Local Group to study the future evolution of the MW–LMC system.

We position the three galaxies (MW, Andromeda and LMC) at the centre of their haloes and start the orbit integration using the present day position and velocities, which we take from the McConnachie (2012) compilation. When calculating velocities, we adopt the Kallivayalil et al. (2013) proper motion for the LMC and the van der Marel et al. (2012a) value for Andromeda (note that these proper motions are consistent with the recent *Gaia* DR2 estimates; Gaia Collaboration et al. 2018; van der Marel et al. 2018).

+ EAGLE for merging result




External galaxies
Andromeda
MW today
MW after LMC merger
black hole mass, M_{BH} [$M_\odot$]
spheroid stellar mass, $M_{*,sph}$ [$M_\odot$]
10^{6}
10^{7}
10^{8}
10^{9}
10^{10}
10^{9}
10^{10}
10^{11}
10^{12}

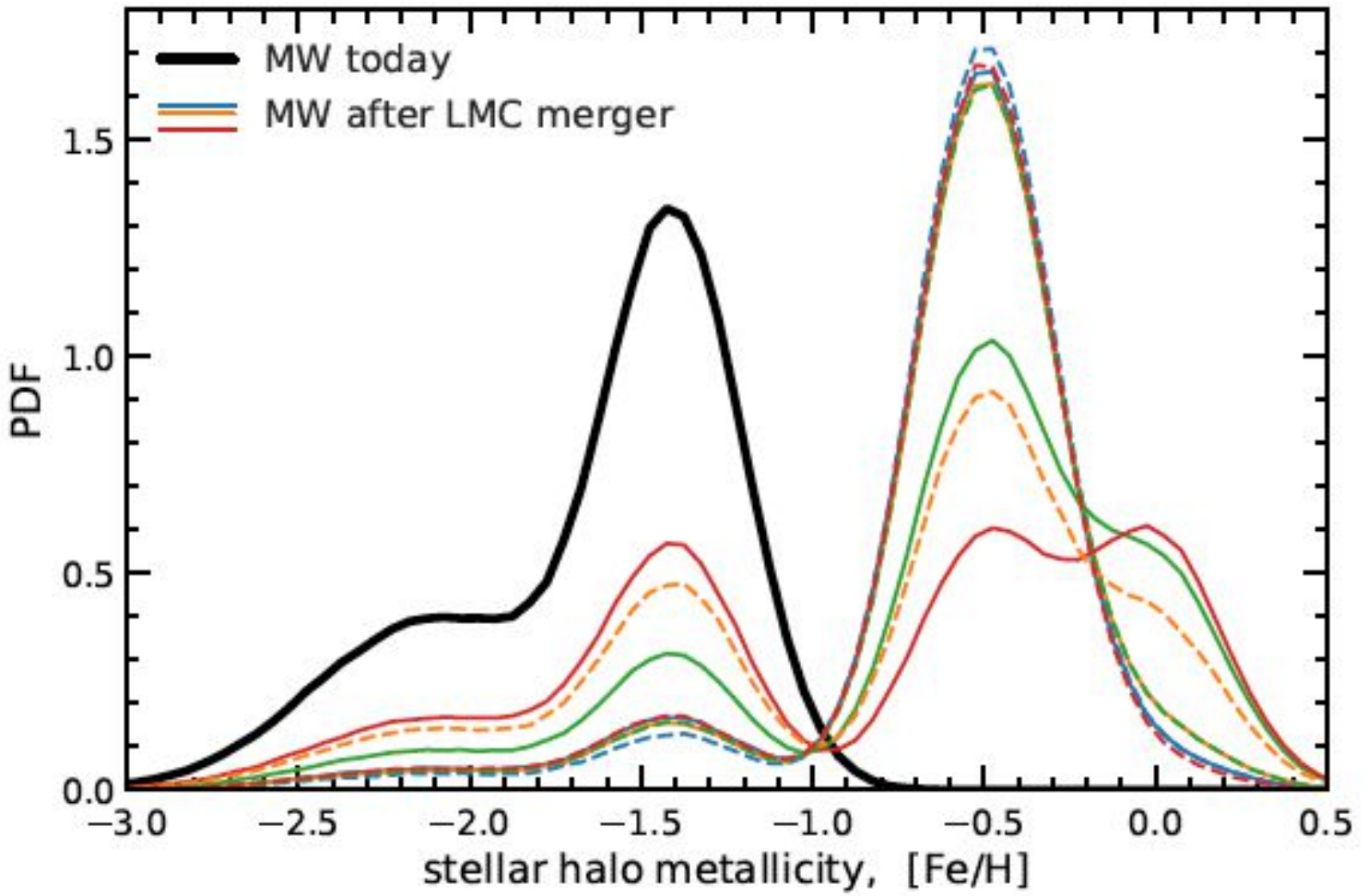


Figure 7. The probability distribution function of the metallicity of the Galactic stellar halo following the merger with the LMC. The present day metallicity distribution (Xue et al. 2015) is show as a thick black line and the possible outcomes after the LMC merger as colour lines corresponding to each of the 8 MW–LMC analogues; the colour-scheme is as in Fig. 3.