A&A 652, C3 (2021)
https://doi.org/10.1051/0004-6361/202038501e
© ESO 2021

Astronomy & Astrophysics

Iron in X-COP: Tracing enrichment in cluster outskirts with high accuracy abundance profiles (*Corrigendum*)

Simona Ghizzardi[1], Silvano Molendi[1], Remco van der Burg[2], Sabrina De Grandi[3], Iacopo Bartalucci[1], Fabio Gastaldello[1], Mariachiara Rossetti[1], Veronica Biffi[4,5,6], Stefano Borgani[7,8,4,9], Dominique Eckert[10], Stefano Ettori[11,12], Massimo Gaspari[11,13,⋆], Vittorio Ghirardini[14], and Elena Rasia[7,4]

[1] INAF – Istituto di Astrofisica Spaziale e Fisica Cosmica di Milano, Via A. Corti 12, 20133 Milano, Italy
e-mail: simona.ghizzardi@inaf.it
[2] European Southern Observatory, Karl-Schwarzschild Str. 2, 85748 Garching bei Muenchen, Germany
[3] INAF – Osservatorio Astronomico di Brera, via E. Bianchi 46, 23807 Merate, (LC), Italy
[4] Institute of Fundamental Physics of the Universe, via Beirut 2, 34151 Grignano, Trieste, Italy
[5] Harvard-Smithsonian Center for Astrophysics, 60 Garden St., Cambridge, MA 02138, USA
[6] Universitäts-Sternwarte München, Scheinerstr. 1, 81679 München, Germany
[7] Dipartimento di Fisica, Sezione di Astronomia, Università di Trieste, via Tiepolo 11, 34143 Trieste, Italy
[8] INAF-Osservatorio Astronomico Trieste, via Tiepolo 11, 34123 Trieste, Italy
[9] INFN, Instituto Nazionale di Fisica Nucleare, Trieste, Italy
[10] Department of Astronomy, University of Geneva, ch. d'Ecogia 16, 1290 Versoix, Switzerland
[11] INAF–Osservatorio di Astrofisica e Scienza dello Spazio di Bologna, via Piero Gobetti 93/3, 40129 Bologna, Italia
[12] INFN, Sezione di Bologna, viale Berti Pichat 6/2, 40127 Bologna, Italy
[13] Department of Astrophysical Sciences, Princeton University, 4 Ivy Lane, Princeton, NJ 08544, USA
[14] Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, Cambridge, MA 02138, USA

A&A 646, A92 (2021), https://doi.org/10.1051/0004-6361/202038501

Key words. X-rays: galaxies: clusters – galaxies: clusters: general – galaxies: clusters: intracluster medium – large-scale structure of Universe – errata, addenda

We discovered a conversion error in deriving the expected iron yield $\mathcal{Y}_{\rm Fe}$ for Maoz & Graur (2017) values (see gold shaded area in our Fig. 19 in the original paper). Expected yields are evaluated through equation 12 and converted to solar units (see Eq. 11). We adopt the solar abundance measurements by Asplund et al. (2009); under this assumption, the solar iron abundance is $Z_{m,\odot} = 0.00124$; this is the solar iron abundance by mass fraction with respect to the gas mass, namely $(\rho_{\rm Fe}/\rho_{\rm gas})_\odot$. This is the value reported in our Sect. 5.1 and used throughout the paper. However, when we derived $\mathcal{Y}_{\rm Fe}$ using the $y_{\rm Ia}$, $k_{\rm Ia}$, $y_{\rm CC}$, and $k_{\rm CC}$ estimates from Maoz & Graur (2017), we erroneously used $Z_{m,\odot} = 0.00174$, which is the solar iron abundance by mass fraction with respect to the hydrogen mass, $(\rho_{\rm Fe}/\rho_{\rm H})_\odot$, leading to a wrong expected range for the iron yield. The correct estimate for $\mathcal{Y}_{\rm Fe}$ is $\mathcal{Y}_{\rm Fe,\odot} = 3.65^{+1.30}_{-1.30} Z_\odot$.

In the meantime, Freundlich & Maoz (2021) published updated values for Type-Ia supernova (SNIa) rates. Their new estimates provide $k_{\rm Ia} = 3.1^{+1.1}_{-1.0} \times 10^{-3}\, M_\odot^{-1}$, which leads to $\mathcal{Y}_{\rm Fe,\odot} = 2.34^{+0.63}_{-0.56} Z_\odot$. By chance, the new updated value is not very different from the wrong value reported in Ghizzardi et al. (2021), leaving our discussion and main conclusions unchanged.

The last paragraph in Sect. 5.2 should be replaced with:
"Recently, it has been shown (see Maoz & Graur 2017 and Friedmann & Maoz 2018) that type Ia SN explosions in galaxy clusters are more frequent than in the field. If, following Maoz & Graur (2017), we assume a $\rm SN_{Ia}$ rate per unit mass of $k_{\rm Ia} = (5.4 \pm 2.3) \times 10^{-3}\, M_\odot^{-1}$, we derive $\mathcal{Y}_{\rm Fe,\odot} = 3.65^{+1.3}_{-1.3} Z_\odot$. More

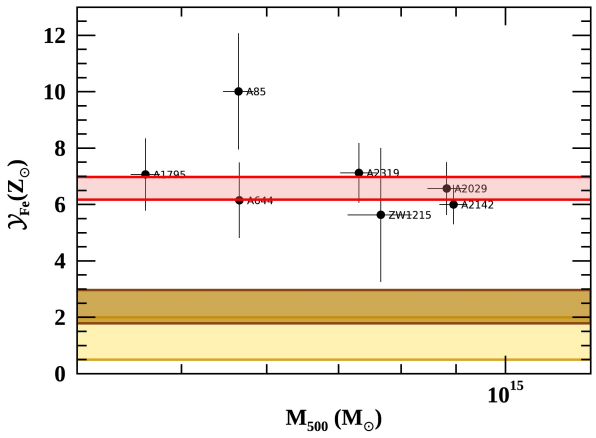

Fig. 19. Effective iron yield for the clusters of the sample. The red band is the 68% confidence interval around the mean. The yellow band shows the expected value computed through the SN yields derived from Maoz & Graur (2017) and Renzini & Andreon (2014; see text for details); the gold band represents the expected value derived assuming recent estimates for SNIa rates in galaxy clusters by Freundlich & Maoz (2021).

⋆ Lyman Spitzer Jr. Fellow.

recently, Freundlich & Maoz (2021) published updated values for SNIa rates in clusters, $k_{\rm Ia} = 3.1^{+1.1}_{-1.0} \times 10^{-3}\ M_{\odot}^{-1}$, which lead to $\mathcal{Y}_{\rm Fe,\odot} = 2.34^{+0.63}_{-0.56} Z_{\odot}$ (gold shaded region in Fig. 19). This revised SN rate brings the expected effective yield closer, but it is still well below the measured ones."

Figure 19 should be replaced with the one reported here.

References

Asplund, M., Grevesse, N., Sauval, A. J., & Scott, P. 2009, ARA&A, 47, 481
Freundlich, J., & Maoz, D. 2021, MNRAS, 502, 5882
Friedmann, M., & Maoz, D. 2018, MNRAS, 479, 3563
Ghizzardi, S., Molendi, S., van der Burg, R., et al. 2021, A&A, 646, A92
Maoz, D., & Graur, O. 2017, ApJ, 848, 25
Renzini, A., & Andreon, S. 2014, MNRAS, 444, 3581