

On the kinematics of neutral gas in GRB host galaxies

M. Arabsalmani^{1,2}, P. Møller¹, W. Freudling¹, T. Zafar¹, J. P. U. Fynbo², L. Christensen² and S. Savaglio^{3,1}

¹European Southern Observatory, Karl-Schwarzschild-Strasse 2, D-85748 Garching bei München, Germany

email: marabsal@eso.org

²Dark Cosmology Centre, Niels Bohr Institute, University of Copenhagen, Juliane Maries Vej 30, 2100 Copenhagen, Denmark

³Physics Department, University of Calabria, via P. Bucci, I-87036 Arcavacata di Rende, Italy

Abstract. We analyze a sample of 20 absorption systems intrinsic to long duration GRB host galaxies at $z > 2$ for which the metallicities are known. We compare the relation between the metallicity and cold gas velocity width for this sample to that of the Damped Lyman-alpha systems (DLAs) in the sight-lines of quasars (QSOs), and find complete agreement. We then compare the redshift evolution of the velocity-metallicity relation of our sample to that of QSO-DLAs and find that also GRB hosts favour a late onset of this evolution, around a redshift of ~ 2.6 . We compute predicted stellar masses for the GRB host galaxies using the prescription determined from QSO-DLA samples and compare the measured stellar masses for the four hosts where stellar masses have been determined from SED fits. We find excellent agreement and conclude that, on basis of all available data and tests, long duration GRB-DLA hosts and intervening QSO-DLAs are consistent with being drawn from the same underlying population.