On the Nature of the Broad ^{26}Al Line Observed by GRIS

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Recent observations of the Galactic Center region by the GRIS balloon-borne germanium spectrometer have determined that the diffuse 1809 keV emission resulting from the decay of ^{26}Al has an intrinsic width of 5.4 keV FWHM. This line width indicates that the ^{26}Al is either at a temperature of $\sim 4.5 \times 10^8$ K or it has a nonthermal velocity of $\sim$500 km s^{-1}. Previous authors have suggested that the ^{26}Al must be trapped within dust grains in the ISM in order for these conditions to persist over the 10^6 year lifetime of the aluminum (see e.g. Naya et al. 1996, Chen et al. 1998). We discuss the results of our model in which ^{26}Al dust grains are produced in Type II supernovae and are subsequently reacceleration in the ISM by ambient supernova remnant (SNR) shocks. Our results show that dust grains can be maintained at a velocity sufficient to explain the GRIS observation for ISM densities of ~ 0.2 cm^{-3}, dust grain sizes near 10^{-5} cm, and distances between SNR shocks in the ISM of 100 - 200 pc.