Title: **Properties of Neon, Magnesium, and Silicon Primary Cosmic Rays Results from the Alpha Magnetic Spectrometer**

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Abstract: We report the observation of new properties of primary cosmic rays, Neon (Ne), Magnesium (Mg), and Silicon (Si), measured in the rigidity range 2.15 GV to 3.0 TV with 1.8×106 Ne, 2.2×106 Mg, and 1.6×106 Si nuclei collected by the Alpha Magnetic Spectrometer experiment on the International Space Station. The Ne and Mg spectra have identical rigidity dependence above 3.65 GV. The three spectra have identical rigidity dependence above 86.5 GV, deviate from a single power law above 200 GV, and harden in an identical way. Unexpectedly, above 86.5 GV the rigidity dependence of primary cosmic rays Ne, Mg, and Si spectra is different from the rigidity dependence of primary cosmic rays He, C, and O. This shows that the Ne, Mg, and Si and He, C, and O are two different classes of primary cosmic rays.

Executive Summary: AMS-02 measures nuclei in cosmic rays up to Iron and beyond between fraction of GV to multi-TV. AMS-02 collected and already published primary cosmic ray light nuclei fluxes He, C, O in cosmic rays finding that they have similar rigidity dependence above 60 GV and all exhibit a hardening at about 200 GV. In this work the measurement of the heavy primary nuclei Neon (Z=10), Magnesium (Z=12) and Silicon (Z=14) by AMS-02 is reviewed. The resulting fluxes of cosmic ray Ne, Mg and Si exhibit a similar rigidity dependence above 86.5 GV and show a hardening at about 200 GV. Remarkably it will be shown that Ne, Mg, Si spectra show a different rigidity dependence from He, C and O.