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## Bootstrapping the Muon Collider: Massless Neutrinos in the g-2 Delivery Ring

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The impedance model opens an old window on the roots of string theory via the S-matrix bootstrap. There is no Lagrangian. Equations of motion calculate mode impedances of the S-matrix. These govern amplitude and phase of energy transmission, such that the S-matrix impedance representation is also the gauge group, with direct interaction of both flavor and color matrix elements the citizens of Chew's 'nuclear democracy'. Naturalness comprises the consistency conditions[1]. The model requires just three assumptions - geometry, fields, and a mass gap - is finite without renormalization, and appears to be maximally analytically continued. There are no free parameters. It suggests a simple proof-of-principle experiment in the Fermilab muon g-2 delivery ring, demonstrating both massless oscillation and possibility of low-energy Muon Collider lifetime enhancement, complementary to high-energy time dilation of the Lorentz transform[2].

[1][https://www.researchgate.net/publication/335240613\\_Naturalness\\_begets\\_Naturalness\\_An\\_Emergent\\_Definition](https://www.researchgate.net/publication/335240613_Naturalness_begets_Naturalness_An_Emergent_Definition)

[2][https://www.researchgate.net/publication/359592916\\_Bootstrapping\\_the\\_Muon\\_Collider\\_Massless\\_Neutrinos\\_in\\_the\\_g-2\\_Delivery\\_Ring](https://www.researchgate.net/publication/359592916_Bootstrapping_the_Muon_Collider_Massless_Neutrinos_in_the_g-2_Delivery_Ring)

### In-person or Virtual?

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