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Power Efficient Plasma Technique for Rapid Water Sterilization[1]

ADY HERSHCOVITCH, Brookhaven National Laboratory — Water especially good quality drinking water is a dwindling resource for significant segments of the world population. The BBC quoted this article (http://www.ft.com/cms/s/2/8e42bdc8-0838-11e4-9afc-00144feab7de.html) for a claim that water shortage is a bigger problem than climate change. One option for increasing the water supply is to recycle waste and polluted water by inexpensive, environmentally friendly methods. First steps involve filtrations while the last step is water disinfection. Presently disinfection is done chemically and/or UV radiation. Some chemicals cannot be used in large quantity due to residual toxicity, while UV disinfection systems consume a great deal electricity. Plasmas in water are very attractive for water sterilization due to UV radiation, ozone, etc. generation inside the water volume. Commercially available devices like NK-03 Blue Ballast System are used aboard ships for water purification. But, presently utilized plasmas: glow, pulsed arcs are not power efficient. Vortex stabilized plasmas, which are power efficient, can even degrade medications (antibiotics) advancing the state-of-the-art by orders of magnitude, especially when combined with electron beams. Disinfection scheme will be presented.

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Ady Hershcovitch
Brookhaven National Laboratory

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