Sponsor: Dr.Bikson

A low-cost (disposable) non-invasive brain stimulation circuit

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**Need Statement:** Need to find a way to make a low cost tDCS device that can be disposed after a single dose.

**Verify accuracy of need statement against problem:** The problem is to provide a non-invasive treatment for problems such as depression, anxiety or chronic pain. TDCS is an experimental treatment and while safety is not an issue, its effectiveness is debated. However the production of a low cost tDCS device could help patients easily get access to the treatment and provide data for researchers. If the cost is low enough tDCS could be found to be a reliable treatment for neuropsychiatric problems.

The need for a disposable device may not address the problem of tdcs devices being too high in price to deploy to many patients. Developing a single use device may not ultimately be cheaper than a reusable tdcs, circuits and electrical components usually do not degrade in 20-30 minutes because of the relatively high quality of even the cheapest materials. The limiting factor in cost may not be things like the size of the battery or component quality. This is especially problematic if multiple doses are needed to see results. A disposable tdcs may not ultimately be cost effective even if it is cheaper, the cost must be so low that it will outweigh the benefits of a reusable circuit.

**Confirm that the need is solution independent:**

The need statement is appropriate given that the sponsor wants something that is both disposable and cheap. Although if the sponsor actually just wants something cheap, disposability may not be a need necessarily and should not limit its approach.

**Validate that the scope of the need is appropriate:** The scope of the need is appropriate, in fact such devices already exist, implementation of a disposable device has however not been done. So the scope is in fact fairly narrow to experimental neuropsychiatric therapy

**Define need criteria and classify need:** There are criterias that must be met for the solution to be successful.

1. The duration of the treatment; it should last 30 minutes to an hour in, an area free from disturbances.
2. The effectiveness of the device is dependent on the correct placement of electrodes.
3. The intensity of the device; the current flow. I.e.) 0.5 mA, 1 mA, 2 mA.
4. Contact quality.
5. Material used should be relatively inexpensive and eco-friendly in order for easy recycling.
6. This device could present a business opportunity in that low cost and disposability could help people who would otherwise not use tdcs become consumers of this treatment.