

TII Researchers improve tools for modelling high-powered energy beams

The new vircator model allows researchers to explore over 10 million different ones in two days.

ABU DHABI, UNITED ARAB EMIRATES, September 13, 2021 / EINPresswire.com/ -- Researchers have explored different designs for generating high powered radio beams for years. One of the most promising approaches for sending out super-high powered radio waves is called a [Vircator](#). However, these are not very efficient with existing designs typically losing almost 90% of their power as heat.



Although people have been studying these beams for 30 years, researchers are still not clear how small variations in the parts can impact the final performance of a device. Now, researchers at the [Technology Innovation Institute](#) in the UAE have developed a better model that allows them to explore which small differences have the biggest impact on performance.

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Mae AlMansoori, Senior Mechanical Researcher at TII

It can cost US\$1 million to build one in the lab, so researchers are always on the lookout to test the expected performance of one design variation on a computer using a computer simulation. However, it still takes a day to test one variation on a high-powered computer. The new model allows researchers to explore over 10 million different ones in two days.

One of the fundamental problems with Vircator designs is that it's hard to predict how minor variations in the components used to build them will affect performance. Mae AlMansoori, Senior Mechanical Researcher at TII said, "All manufacturers have different ways of making components that can cause different types of variations. This research will make it easier to

tease apart which mechanical and electrical elements are more important."

For example, it may be a case of minute differences in the width of one wire or the resistance of another part that have a far greater impact than similar minor differences in other parts. This research will help identify and prioritize where manufacturers and researchers need to focus their attention.

To access the science paper please click: <https://ieeexplore.ieee.org/document/9256261>

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