So the way that electrical network works is that you have very high electrical fields and currents running through the system. But a lot of times in your home, you don't require so much current

So sometimes you need to switch huge amounts of electrical currents so they don't go into specific local networks.

They suddenly disengage and so they stop the current that goes into different specific places.

**Regarding the fact that you are carrying these researches out in Israel, I wanted to ask whether the conditions are different from the other countries that you collaborate with or not?**

I would say the main thing that is different is that instead of getting on a train and traveling easily from one place to another within two hours, I need to actually go on an airplane. So in a way, Israel is a bit of a forced island.

We're not really an island, but we are really an island because we can't go to any of our borders. So in that respect, that's something that I feel, aside from the fact that most of the interaction today is done via Zoom.

**Israel has a strong scientific community. Was there a point in time where there was a boom in technology in Israel?**

You can always look at Israel as 'pre' eastern block opening and 'post', so 1991, once perestroika and all of that stuff happened, we got a huge influx of immigrants from Russia, Ukraine.

A lot of the people that came were highly educated, highly professional and it was about 20% of the population. So our population increased by 20%, and 20% of mostly highly professional, highly skilled people.

If you look for a phase change, that's a phase change, yet an equilibrium before that of specific technological activity, which before '91 was mainly financed and driven towards security related issues or weapon development. And since '91, a huge shift happened, much more basic research, much more applied. In a way it's a direct derivative of the fact that you have much more activity. So you can't have all of them doing weapons,

**Going back to the international cooperation, what are the biggest pros and cons?**

I can't go and drink coffee every day with the people I work with. When you sit with somebody in a meeting, we can interact and then pass some of the information.

That's nothing compared to the information that can be passed when you sit with somebody and you talk with him and you're with him in this city and you drink coffee with him. And there's a very simple reason to that. We're not computers.

Any interaction which is expanding my limits, outside my own tiny silo- my own tiniest silo is here in my room. Broader silo is my corridor, my country. So every time you expand your frame of reference, you can create something new.

# Physicist on the 'island' of Israel

Redactor: Anna Kudrnová 2025, Prague-Jerusalem

**Yinon Ashkenazy** is an Israeli physicist and professor specializing in **material science**. He completed his academic training in Israel, earning his bachelor's, master's, and Ph.D. degrees. After his doctoral studies, Ashkenazy pursued postdoctoral research at the **University of Illinois at Urbana-Champaign**, one of the leading research institutions in the United States

Ashkenazy's interest in **tangible, real-world physical phenomena** led him away from more abstract areas of physics, such as particle astrophysics, and into material science—a field filled with practical challenges and everyday applications.

Although his work is mostly theoretical, often using the **Monte Carlo** model, Ashkenazy emphasizes applied relevance. He currently collaborates with research groups at **Uppsala University** and **CERN**.

His research focuses on the **behavior of materials under extremely high electric fields, phase transitions** in materials and most recently the **design of self-organizing materials**.

In the latter, he investigates how combinations of materials can spontaneously form complex internal structures.

Ashkenazy considers ongoing learning and discovery fundamental to his work, describing scientific research as a lifelong journey of understanding.

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*The excerpt from the interview is about the profession of a physicist and professor at the Hebrew University of Jerusalem. It looks at topics such as Israel's technological innovation, history, industrial sectors in which materials physics is currently applied, and more.*

**You mentioned that you work with phase transitions, and you were talking about electrodes on the surface. So which industrial sector would you say your research is most applicable?**

Originally it was for particle accelerators. So in a way, particle accelerators, it's something useful, right? Somebody has cancer, a lot of time, their treatment is by radiation.

So in most hospitals today, you have particle accelerators that are used to treat cancer. One of the direct derivations of what I'm doing is the possibility of creating accelerators which are much, much smaller for treating cancer, which might then be used to allow killing tumors without any collateral damage to the surrounding body

Another option is what's called vacuum interrupters.