# Audio file

[2024-03-13 13-31-11\_1.mp3](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

# [Transcript](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:00:01 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Because if the.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:00:04 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[For photonic chips, you can leverage the semiconductor process.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:00:08 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[The meaning process everybody's different designs.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:00:15 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Different functionalities on the same chip in one go.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:00:20 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[So if you.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:00:22 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[You know for proper.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:00:25 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[We call it foundry for proper factory. It can have thousands of 10s of thousands of wafers.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:00:31 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[And produced per day and each wafer.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:00:35 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Can contain thousands of chips.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:00:38 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[So it's a lot of them. So that's the way because because people need to bring cost down for such a system that's beneficial for everyone. That's how you know our smartphone can be so.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:00:51 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Powerful.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:00:52 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[And the way to cost down is to volume up.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:00:57 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[That's the only way. So semiconductor technology is the way to go for the volume up. So chips also have benefit for the cost.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:01:07 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[OK. And I think that's very interesting that's I also read that in your one of your latest publications.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:01:15 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[That there is currently the size of like 100 thirty 193 nanometers. I read somewhere that the photonic chips so does the more more law also apply to photonic chips? Are you trying to cut that down in like the same tempo or how does that work?](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:01:32 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yes.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:01:35 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[We have also most law. Well, most law in in the photonics actually we have a plot very similar to that in industry showing that yes it actually is it is the.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:01:49 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[The number of functions we can integrate in a single chip.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:01:54 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Kind of double s every certain few years.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:01:57 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[So.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:01:59 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Very similar to the electronics.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:02:04 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[And because of more and more applications that require a very complex optical system, maybe you have heard of LIDAR light ranging and detection for the autonomous cars. It needs a large array of large number of optical components integrated.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:02:22 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[I mean, thousands at least, or 10s of thousands. Also, neuromorphic computing.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:02:31 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Neuromorphic computing is, like you design A processor which mimic the human brain, so you have neurons, which is spike to next 100 neurons, then spike to the next.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:02:44 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[You can do it on the chip, and the photonics is a perfect candidate and to some extent even better than the electronics. Yeah. So there's a huge work.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:02:54 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Globally, on neuromorphic processors, on photonics, and that, you need really millions millions of optical components in integrating your chip.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:03:04 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[So.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:03:05 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[The technology also is dragged by IS is, you know, stimulated by the market needs that, yeah, we need more smaller components, more, more devices integrated. So that's why we are also keeping more or less in most lawful photonics.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:03:20 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Although I have to point out that the trend is very similar to the IC, most law, the classic most law, but the absolute number.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:03:29 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Has the order of magnitude difference nowadays IC have? I don't know a billion transistor per chip or per square millimeter? For us it's several.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:03:42 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Zeros removed so we are talking about here. I think the state-of-the-art for photonics is like 100,000 ish. That's the maximum.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:03:52 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[So we are still lagging behind because photonics starts later than the electronics, but we are almost saying like.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:03:58 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:04:00 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[OK. And you talked a little bit about things like Lidar. I also talked to one of your students. He told me about with Apple, you have a face ID.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:04:12 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yes.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:04:14 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Applications like that are those like the most interesting aspects that you see in the future where it can be applied or are there any other sort of things where it's already being integrated?](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:04:26 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah, I I know where the example came from. Those are the examples that have already been successful on the market.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:04:30 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[OK.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:04:37 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[So they, you know.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:04:40 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[For.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:04:41 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[We are for us, we usually research something that are not.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:04:47 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yet, you know, uh, commercialized and usually 2010, 20 years ahead of.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:04:54 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Products.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:04:56 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Uh.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:04:57 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[So actually what has been available in the iPhone the the LIDAR or the face ID on the iPhone is actually?](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:05:06 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[I have to say the the mature technology we developed 20 years ago.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:05:13 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[So.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:05:14 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[And there's no secret to it because people have been studying it for 20 years. So. So that's why I used.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:05:19 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[It in my course.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:05:21 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[UM.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:05:22 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[As as example, but we also here we we investigate things like we really look ahead what 2020 years later, what the feel that we'll need. Yeah.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:05:37 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[And yeah.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:05:37 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Lidar is more Lidar is is a more low hanging fruit because it's not that far away.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:05:45 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[And not that ready. It means it's not yet on the market, so mature.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:05:51 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[But it's also it can't be like.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:05:55 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[It can't be. It will be too late if it's twenty years later. So lighter is something in between, like five years, OK?](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:06:03 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Do more applied research, yeah.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:06:06 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[And and then I also really curious what do you think will happen in those 1020 years, do you think if the photonic chips keep on the same pace and they start becoming smaller and smaller and more powerful, will they replace all traditional chips or will they work together? How do you see that?](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:06:25 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[It's a very good question because many people think, yeah, photonics will be the future and you know, photonic computing, blah, blah blah.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:06:37 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[But to be honest, I think.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:06:41 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Photonics is not the only future and I think photonics photonics is more powerful when combined with others.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:06:48 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[I can give you a simple example.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:06:51 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[You know all the computer, all the you know.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:06:56 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Cell phones, computers we use. They're digital, right? They're digital electronics. You need digital.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:07:02 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Uh.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:07:06 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Transistors or diodes?](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:07:08 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[To form a digital circuit.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:07:11 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[That's actually needed for the classical computing.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:07:14 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[But photons photonics is horrible.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:07:18 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[At the digital.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:07:20 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Domain. So photonics is excellent in analog domain.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:07:20](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[OK.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:07:26 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[And for the electronics is the opposite.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:07:31 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[So and in our world, we need both digital and analog.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:07:35 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Right. Because OK, digital is great at the processing images, videos.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:07:41 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[That's the digital domain, but.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:07:45 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Human analog. So we need an analog interface between the digital and human.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:07:52 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Because we are using it. So my point is in the real world we need both sides and why not let photonics and electronics play their best role?](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:08:03 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[In either of the domains, right, they don't have to be really competing.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:08:08 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Winning each other, but they can be complementary.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:08:12 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah, exactly.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:08:13 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[In the future, you might think, oh, there might be some photonic neuromorphic engine in analog 1.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:08:21 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[In the Intel's digital CPU.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:08:25 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[That's what we are thinking 20 years in 20 years.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:08:30 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[You know.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:08:31 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah. What I also found really interesting what I've read.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:08:36 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Is now you of course have already, like photonics, like the fiber optic cables.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:08:41 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[That have been laid between connections, but from what I understand most computers right now they the photonic cable enters into the computer, but then it gets transferred and that is way way slower. And what I also heard is that not only the chips but also all the other connections in the computer.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:09:02 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Some people are trying to get them also on the photonics so that you get extremely quick communication between a computer and the rest of the world.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:09:10 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[How does that work exactly?](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:09:13 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[That exactly fits my, you know.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:09:17 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[My idea of being complementary because OK.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:09:23 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Electronics. You can make a very excellent CPU and memories on silicon.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:09:29 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[But transferring the data through electrons is horrible through, you know, electrons passing through copper wires. It's horrible.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:09:32 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[OK.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:09:39 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah. So and photonics is excellent for this.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:09:43 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[So photonics, you cannot do memory on photonics, it's bad.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:09:49 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Digital computing for photonics is bad, but the photonics is excellent in delivering.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:09:54 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Messages or or data from one point to the other at the speed of the light, right and.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:10:02 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[And you can overlap. You can overlap several channels of photonic communication channels physically.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:10:09 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Together, where electrons you can't. So actually that's actually the setting. The selling point of it. Using photonics to interconnect between.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:10:19 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:10:20 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[CPU actually, it's already partially being commercialized and many advanced data centers. If you're looking to, I don't know, Netflix, Facebook.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:10:24](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Oh.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:10:32 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[What else? Well, Google, they actually have. They hire photonics engineers.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:10:40 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Why? Because they actually they are building these kind of photonic links.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:10:46 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Between CPUs.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:10:49 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Used in their data centers because copper wire will basically slow down everything they need. Photonics for this.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:10:58 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[So it's not yet in everybody's.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:11:01 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Smartphone or CPU but it is in the data center now.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:11:05 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah, the high end already has the yeah.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:11:06 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[High end market already. Yeah, yeah, yeah.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:11:09 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[OK, great. That's very good to know.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:11:13 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Then I also read a lot about. I hope I pronounced correctly Indium phosphide. The ion, yeah. And is that a replacement for silicon? Is that like comparable or how how can I see that? Yeah.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:11:19 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[In this slide, yeah.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:11:31 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[I also don't agree on, you know, somebody's argument that one has to win over the other. It's simply that different materials are will be good at different things.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:11:44 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[UM.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:11:46 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Enforcement is not replaced is irreparable.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:11:51 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Replaceable is not replaceable.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:11:55 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Because it it is the best material you need to generate and detect the light.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:12:02 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[If you ever want to manipulate the light in your phosphate, is the best best material.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:12:08 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[But in order to guide light to transfer light, you know.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:12:13 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[From one point to the other.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:12:18 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[With lower loss, silicon is the best.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:12:21 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[So.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:12:23 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[UM.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:12:25 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[And the best way is to combine them too.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:12:28 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[You know silicon will be good at something in the phosphate will be good at something and actually that's what we are actually looking at right now in many research program how to combine Indian phosphate onto silicon.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:12:41 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Uh.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:12:44 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:12:44 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah. So a lot of working together.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:12:47 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah, it's actually.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:12:49 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[A hot topic now.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:12:51 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Oh.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:12:52 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[These days because uh, yeah. Uh, even companies like Intel, they are looking into this in many of the in many of the products of uh.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:13:04 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Of Intel, they are already putting in a phosphate in to silicon.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:13:09 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[OK.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:13:12 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[And I also have to point out that silicon cannot do everything by itself. So many people think, yeah, all the IC's are silicon. So silicon is the best material that's actually wrong.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:13:26 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Silicon is the the industry chose silicon because it's cheapest.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:13:31 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[It's the cheapest while giving you acceptable performance, but if you want high high performance silicon is not there. It's the best is the worst one actually.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:13:42](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Oh.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:13:44 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[And actually that's why for the nowadays in the most powerful in our GPU CPU inside you not only find the silicon, you also find other semiconductor materials.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:13:56 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Germanium.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:13:57 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Maybe you know?](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:13:57 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[That no, I haven't heard of that.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:14:00 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah, you can check germanium is a much.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:14:04 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[You know, electrically better material than silicon, so they put in the area they want, they put the germanium.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:14:12 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[There for the transistor instead of silicon.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:14:15 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:14:16 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:14:17 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[So.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:14:17 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[OK.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:14:19 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Even nowadays, people already find out that yeah, only silicon is not enough.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:14:25 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[And then I was also really curious. So how should I see that chip in front of Maine? Should I visualize it as like a lot of fiber optic cables, really small or how can you explain that to a really to your like grandma or something? How simple can you make it? Do you understand my question? Like, how simple can you explain?](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:14:45 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Photonics chip how it works, like how it transports lights into data.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:14:52 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[UM.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:14:54 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[It's a very interesting question.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:15:00 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[What I usually do is I take.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:15:06 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Highway as an example.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:15:08 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[You know it considered highway as the channel for the.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:15:14 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[We fabricate inside the chip.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:15:18 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[And the cars, they are like single photons.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:15:21 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[That photon traveling through the cars and through the through the channel, through the highways.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:15:26 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[And then you have on the highway you have, you know, round the not the roundabouts, but you have crossover.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:15:34 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[You have split splitting that. These also happens in in photonics. So we make structures.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:15:41 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[To manipulate the light to guide the light to the area we want.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:15:46 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[And The thing is.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:15:48 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[You just have to.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:15:50 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[You know.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:15:52 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Highway is, I don't know, several meters 10/10/20 meters wide, but if you then you have to.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:15:59 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Shrink it down a million times.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:16:03 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Imagine shrink down a city a million times. That's the network you have.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:16:08 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[On your chip.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:16:10 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[So but instead of car traveling through the city network.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:16:14 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[It is the photons.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:16:16 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[That's traveling through the optical network.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:16:18 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:16:19 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:16:20 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[And then can you say that the optic layers, they're like the road, so like you have like the optic material that photons travel through and yeah.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:16:31 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:16:33 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[And you also I think have a lot of difficulty. I think the big challenge is like navigating that traffic, sending it to the right places and being as efficient as possible.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:16:42 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yes, of course.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:16:44 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah. And what I heard from your student as well was the big one of the big problems with the current chips is that there's a lot of loss in energy due to heat being.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:16:55 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Generated and essentially lost because you don't want the heat and that's you don't have that with photonics or a lot less or how does that work?](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:17:08 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[UM, we also have a heat problem. Well.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:17:14 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[To some extent, we face the same challenge as the electronics people because when you turn on a transistor or turn on a laser, in our case, they generate heat. That's.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:17:27 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Physics.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:17:31 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[You can't really get rid of it because it's physics and but there are, you know, this is more of an engineering problem that you need to engineer how to guide how to extract the heat efficiently.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:17:44 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[And on the other hand, more of a research domain is that how can you create more efficient energy efficient devices?](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:17:54 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:17:56 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[More energy efficient. That's the goal, yeah.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:18:01 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[And then I also found it really interesting that photonics really is mainly being worked on in the Netherlands. There's other couple of countries that are trying to get to catch up from what I understand. But Netherlands is the most ahead.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:18:16 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[I wouldn't. Yeah, I wouldn't.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:18:18 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Is is.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:18:18 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[That correct? Or am I totally wrong?](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:18:20 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[That could also be the case.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:18:21 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[I think it's an over claim.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:18:23 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Overclaim OK.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:18:24 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah, I think.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:18:27 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Netherlands is strong, but I wouldn't position any one of the country to be the top because there's not no such thing.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:18:29 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:18:36 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[UM.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:18:40 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah. If I look at the US, they invested 10 times more than Netherlands.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:18:45 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Are they the top?](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:18:46 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[1.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:18:47 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Maybe uh, if I look at Belgium, they have iMac. They do way more advanced uh technology than us.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:18:57 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[UM.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:19:01 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[But at a different scale, we are at the research there at a more.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:19:05 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[More for customers, but are they? Are they the top one? I don't know. It depends on how you look at this this thing.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:19:13 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah, that's good.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:19:14 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[But I want to say that we have our Dutch Government is one of the unique that are willing to invest that much.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:19:25 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Investment into photonics research and the photonics ecosystem. So ecosystem not only research institutes, but also the companies.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:19:35 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[So I have to say that.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:19:38 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[The investment that that the Dutch Government put in.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:19:42 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Comparing to the size of this country, I think it's enormous so.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:19:48 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[To this extent, I agree Dutch might be leading.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:19:52 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[You know, in putting the photonics as one of its strategy national strategy, that's very good.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:19:58 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[And.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:19:59 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[I don't see this in any other European country at least.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:20:03 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[OK. And to go a little bit further onto that you of course in the Netherlands have ASML?](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:20:12 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Is it for like the in the next 10 to 20 years? Is it going to be like a a new ASML for photonics is going to be created or is our companies like ASML and TSMC just going to adapt to this new and also create these types of chips?](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:20:34 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Well.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:20:37 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[It's it's very hard to say. It's very hard to say.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:20:38 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:20:42 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[But looking at from you know what's the?](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:20:47 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Current you know the how the the photonic startups grow around us, I think they are in very good condition and they may.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:20:58 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[For example, the smart photonics, maybe they will one day grow up to the same size as TSMC. I don't know if really the photonics will boom and you know.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:21:09 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[The business is so successful.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:21:12 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[UM.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:21:14 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Whether to the size of HTML, I don't know.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:21:18 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[I think it smells too big.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:21:22](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:21:22 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Two big events should be.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:21:24 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah. Yeah, exactly. Yeah, I I found it very fascinating. The whole how the whole chip market that is now, of course, very, very big. It's like going to be maybe disrupted by this or how it's going to adapt to these changes and work together with photonics. So yeah, but it's difficult to predict, of course.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:21:44 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah. Are there any? Is it? But maybe there's a fun question. What is actually the reason that you are interested in photonix? What what got you into this this field?](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:21:56 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[I don't know.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:22:01 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[You're asking my personal.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:22:03 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah, yeah.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:22:04 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Experience.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:22:07 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[I was born in a family.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:22:11 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Who do photography business?](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:22:16 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[And photography? There's already a photon, the keyword photon inside, you know, in the past photography.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:22:22 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[We we we use this uhm.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:22:27 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[These films. Yeah. Traditional one. Yeah. Then you need to expose it. You need to.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:22:28 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Film. Yeah, yeah.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:22:35 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Develop it.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:22:37 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[In the dark room and there's no Photoshop on it.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:22:42 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[It's still nowadays very similar to what photonics is being made. You need also to expose it, develop it.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:22:49 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[It's. Yeah, it's it. I I find it. Uh. Fascinating. By that time about how what light can do.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:22:58 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[And then I start to.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:23:00 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Study in optics.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:23:03 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Optical physics.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:23:06 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[And when I.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:23:08 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[I think when my career starts, it's just the initial beginning phase of photonic integration.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:23:16 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[So I step in.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:23:19 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[OK. Thank you. Yeah, that's very fascinating to come from. Yeah. Photo being made. Photos to yeah. Photography and to photonics. It's really fun.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:23:30 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Ohh, thank you very much. I think those were all my my questions.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:23:34 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[OK.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:23:35 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah, it it. It wasn't too long, hopefully.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:23:39 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[I will send you the article so that you can review it and see if there's anything incorrect if you want.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:23:46 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[It will take, I think 2, two weeks or something.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:23:47](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[What?](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:23:51 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Something like that. So I want to thank you again for your time and for your flexibility. I'm sorry I couldn't be there at Antonova, but.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:23:59 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah, you missed coffee.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:24:01 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah, yeah, really unfortunate. Sorry. But maybe next time when I'm there.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:24:06 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yes, OK.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:24:07 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Thank you very much. Have a nice day.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:24:09 Speaker 1](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Yeah. Bye, bye.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[00:24:10 Speaker 2](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)

[Bye bye.](https://leidenuniv1-my.sharepoint.com/personal/s4028198_vuw_leidenuniv_nl/Documents/Transcribed%20Files/2024-03-13%2013-31-11_1.mp3)