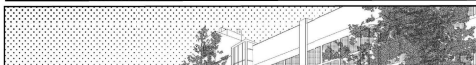


Chapter One: The Uninvited Senior Thesis Student



令和3(2021)年度学術革新領域研究(A)

2.5次元物質科学:

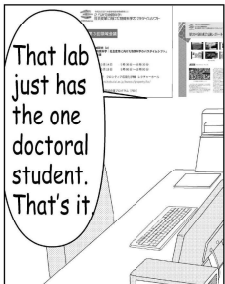
社会変革に向けた物質科学のパラダイムシフト

NEWS
LETTER

Welcome to
the 2.5 D Laboratory

© もんでんひでこ





That lab just has the one doctoral student. That's it



You're telling me you chose it without doing any research?

No way.



No lab welcome party, hiking events?

What's!?

And you know, that doctoral student I hear she's a real nutcase.



けっ
体えない!
Ugh, useless.

Nope.

Of course not.



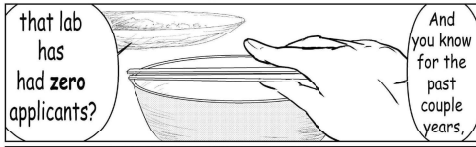
I mean sure, but that's just not interesting to me.

わっわっ
夢だ
てきや
There should be dreams

In the study...



Companies are interested in materials that already have a future not new materials they don't even know if they'll be able to use.



that lab has had zero applicants?

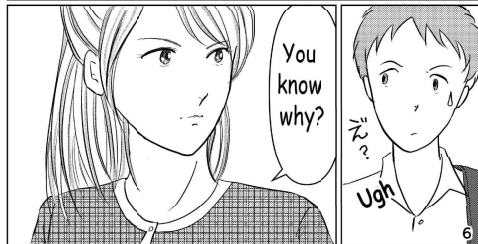
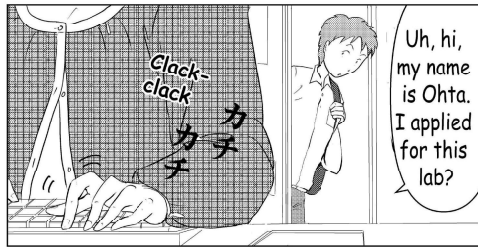
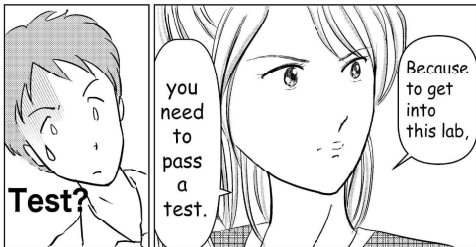
And you know for the past couple years,



B-But what about?

...Or the others?

Huh?

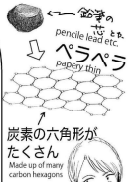


You can't do that, you'll have to join a different lab.



In any case, I'm gonna have you make graphene using the method that won the author the Nobel Prize.

It's just an atom thick.



Graphene is a sheet-like material that's made entirely of carbon.

Gra...

Uh, what's that?



Uh, what?!



is that... impressive?

Stare



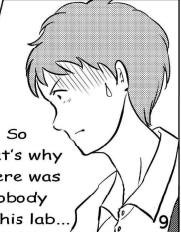
I- Is...



Z-Zone - プリンセス賞!?



Although... Wait,

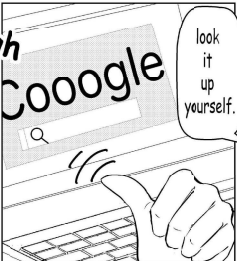


So that's why there was nobody in this lab...

Ugh Cooogle



look it up yourself.



はあああ Well



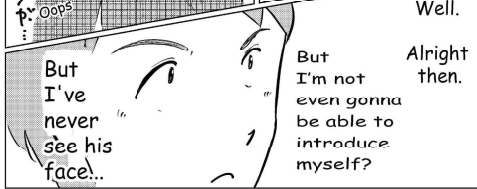


He won't be around for a while

Busy with a conference.

Aha

しまった
オoops



Well.

Alright then.

But I've never see his face!..

But I'm not even gonna be able to introduce myself?

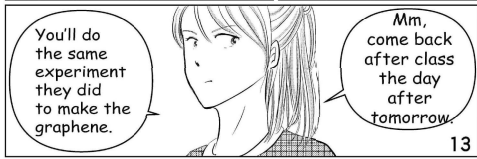


What should I do this when I'm done reading it?

Squeeze

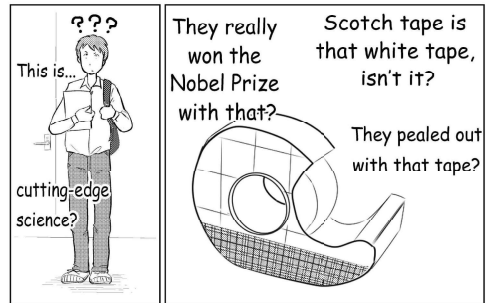
Oh well. Back to research.

いざいざ...
and...this is too much for me



You'll do the same experiment they did to make the graphene.

Mm, come back after class the day after tomorrow.



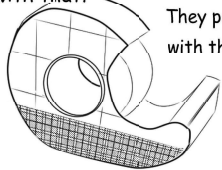
???

This is...

cutting-edge science?

They really won the Nobel Prize with that?

Scotch tape is that white tape, isn't it?



They peeled out with that tape?



Um.



Not here?

Not here.

where's the professor?

Um, excuse me,



I see.

So that itself was the mystery.

And now that I'm actually thinking about it, how do they even make a sheet that's only an atom thick?

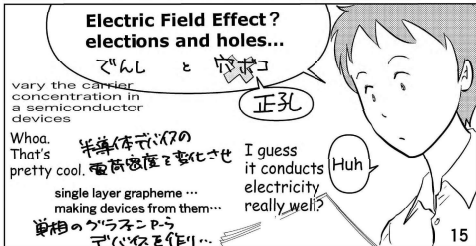
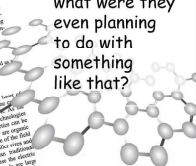
SCIENCE 22 Oct 2004/430E, pp. 660-669

Kinetic Field Effect in Atomically Thin Carbon Films
E.S. Novoselov¹, A.S. Geim¹, S.V. Morozov², D. Jiang², Y. Zhang², S.V. Dubonos², I.V. Grigorieva¹, A.A. Firsirotu¹
¹Department of Physics, University of Manchester, M13 9PL, Manchester, UK
²Institute for Nanostructured Technology, 142412 Cherepovetska, Russia

We describe monocrystalline graphene films, which are just a few atoms thick but nonetheless stable under ambient conditions, versatile and of remarkably high quality. The films are found to be a two-dimensional semimetal with a gap opening between valence and conduction bands and to exhibit a strong anisotropic electro-field effect with their electron-phonon scattering rate $\sim 10^9$ s⁻¹ and with room-temperature mobilities $\sim 10^6$ cm²/Vs. We can be

But what were they even planning to do with something like that?

And... the paper she gave me was the one that got them the Nobel Prize.



Electric Field Effect? electrons and holes...

Whoa. That's pretty cool.

I guess it conducts electricity really well?

Huh



Am I gonna be a stray senior, wandering around looking for a lab?

You can't do it, you're out.

God, I said I'd do it, but... what a situation

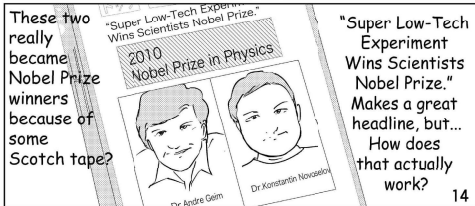
Thank you!



This is the experiment that won them the Nobel Prize

What's Graphene?

Oh well. Time to do some research.

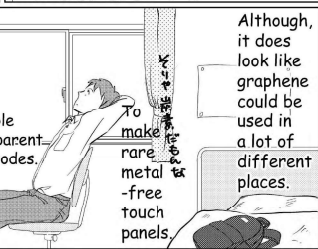
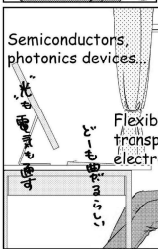
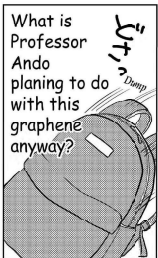


These two really became Nobel Prize winners because of some Scotch tape?

"Super Low-Tech Experiment Wins Scientists Nobel Prize."
2010 Nobel Prize in Physics



"Super Low-Tech Experiment Wins Scientists Nobel Prize." Makes a great headline, but... How does that actually work?



科学技術NEWS

Wait. Solar panels?

It can be used to make solar panels?

Graphene is so small.

グラフェンとは

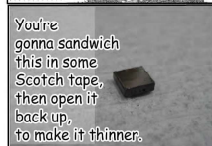
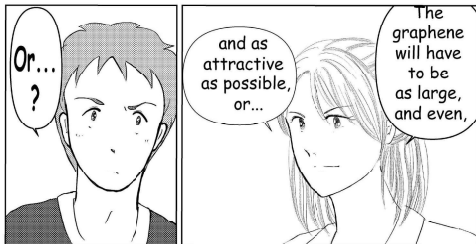
グラフェン太陽電池実用化へ

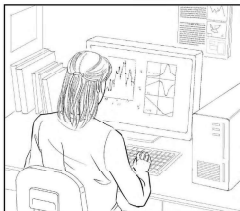
Wait. Solar panels?

Graphene is so small.

17



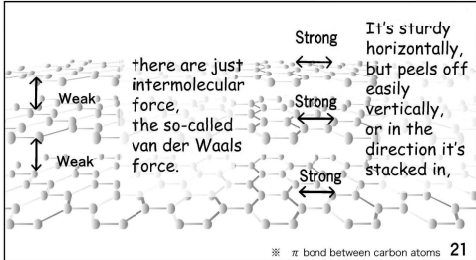




Excuse me,
10th...
why does this peel so nicely like this?

Don't tell me you didn't read the paper.

あ... へん... オoops
The van der Waals force.
Turn



Why is it so small
あ... へん... オoops...
But god, am I clumsy.

あ... へん... オoops...
Do not touch it with your bare hands!

Press it together, and open it back up.

But it's pretty. This is the mass of carbon.

あ... へん... オoops...
Scared me...

Am I... actually pretty good at this?
3rd
2nd 1st
Hey, it actually peels away pretty nicely.

20

