# Outtakes #3: Crash Course Physics

Crash Course: Physics
https://youtube.com/watch?v=ulkM5f1fxRM
https://nerdfighteria.info/v/ulkM5f1fxRM

[PBS Digital Studios Intro]

Dr. Shini Somara: --that life-saving technology is real, and it works because of two main electrical principles: electric potential *pauses* energy, and capacitance. *laughter*

[Crash Course Physics Intro]

S: Now, remember how you add up all the resistances to find an equivalent resistance for resistances in the series-- oh my god. *laughter*

S: --between the spot right next to the point charge-- *inhales sharply* *laughter* What was that?? That was weird.

S: --and we did it with the help of Coulomb's Law, the equation that tells us that the force generated by two charged particles on one another...

S: We call these materials s-- *laughs* What the [censored] is wrong with me? Okay. We call these materials superconductors and *laughing* trust me when I say the research into these materials is a very important and lucrative field of study.

S: *heavy exhale* *laughter*

S: We've used our hypothetical-- hypotheticals... *laughter* New word!

S: Since we have two particles, that each enerate... each generate... Since we have two particles that each generate their own electric fields... Since we have two particles that each... generate... Si-- *sighs* *laughs*

S: Yeah, no.

Nicole Sweeney: This is very serious!

S: It is, it's scary.

S: And since the voltage for each resistor in in this... And since the voltage for each resistor is the same in parallel, you can cancel... And since the voltage for each resistor-- And since the voltage for each resistor is the same in parallel, you can cancel out-- Ahh. And since the voltage is--

[background]: Aaand we're done.

S: A charged object can have electric potential energy when it's held in an electric field. In an electric.

[background]: In an electric.

S: In an electric field.

S: This means if we place a-- you're like-- *laughter* All I just see is--

S: For our defibrillator, this energy is quickly turned from potential energy-- *inhales sharply* *exhales* Just breathing.

S: We also learned about Ohm's Law and the relationship between voltage, current and resis-- resistance.

S: [censored] *laughter* It just is bringing back that anxiety of like, loving physics and then getting to electricity and going "ugh, this is what's gonna fail me."

S: Okay, so you'd have loads of lines coming out of a dot, basically.

[background]: You've gotten further than I have. *laughter*

S: So one way to express the capacitance is to divide the area of each-- Oh my god. *laughter* So one way-- I'm scared. I'm actually scared right now.

S: Can an electric field exist in a conductor, where electrons can move around freely in the material? That's a very long question. (softly) That's one I'm struggling with.

S: Today you learned that-- Just no. *laughter*

S: When they do, they've reached electrostatic equilibrium. Mneh. When they do, they've reached electrostatic equilibrium. Ahh! [censored] Right at the end!

[background]: Oh man, that's a...

S: Okay. When they do, they've reached electrostatic equilibrium.

[background]: Not quite.

S: [censored]

S: Let's say we have a 9-volt battery and we want to know how much current is supplied to a lightbulb when we... (softly) complete the circuit.

S: Always-- I'm amazed, I never really breathe, during the shoot? Anyway.

[background]: Do that.

S: Yeah, I might. Might consider it.

[background]: That sounds familiar... (muffled)

S: Yes. Yeah yeah, we just did that. *laughter* Go back to bed. *laughs*

S: Once the system is at electrosatic-- (mumbled) --still hold true.

S: But when using a pers-- percasitor.

S: Yeah.

S: Yeah, capacitors.

S: Yeeah, man... (singing)

S: Next, once we can generate the next current... *laughter* Next, once we can generate an electric current... Hello.

S: This value is known as capatituh-- capaci*tance*. *laughter*

S: Compared to the ideal battery, it's only a one millim... ampere.

S: I've just bitten my lip twice doing that, saying that.

S: And a positively charged particle with charge positive...

S: Is this that Van de Graaff machine experiment, I wonder.

[background]: We're almost done, in two shots you can (muffled)

S: Okay, who cares. *laughter*

S: We use Ohm's Law to go from an equivalent circuit to solving every current, value, and voltage drop in the system. Today we

saw-- *laughter*

[background]: I think this broke everybody... *laughter*

S: I broke him! *laughter* I broke him, oh god. Sorry.

[background]: Did you see what she did? Oh god... She stopped and she went-- *laughter* Come at me, script! Sorry! Ugh!