

## Dr Shuang Zhang - Metamaterials transcript

Dr Shuang Zhang discusses his work into Metamaterials within The School of Physics at The University of Birmingham.

Title: **Dr Shuang Zhang - Metamaterials** (<http://www.youtube.com/watch?v=p5dOHQKobxg>)

Duration: 3.16 mins

Speaker Names (if given): S1 Dr Shuang Zhang – Reader in Metamaterials

**S1** Our research is mainly about metamaterials and nanophotonics. Metamaterials consist of uni-cells in the scale of nanometres and micrometres; so we call them 'artificial molecules' or 'artificial atoms' in a similar way as the real materials are consisted of real atoms and molecules. So with a greater flexibility and engineering the structure of each uni-cell of the artificial molecules, well we can achieve a very interesting optical power face. Metamaterial research involves making the metamaterials by using nano fabrication techniques; for example they're using electron beam lithography focusing on beam lithography, those top down technologies, as well as some bottom up technologies, which involves assembling the molecules and atoms into nano structures.

There are many uncommon applications, for example a metamaterial can be used to make a sensor for biomedical image or biomedical applications; so we hope that we can make some highly sensitive macro materials so that can help us to detect cancer at a very early stage. And a metamaterial can also be used to achieve a super-imaging lens. So this super-imaging lens can break a defragment in it; we can see things much more than the wavelengths of the light; so this will be truly useful for medical imaging as well as for semi-conducting industries when you do the optical lithography. Metamaterial is a very fascinating topic because of the very unconventional applications it can get, for example the invisibility cloak . The invisibility cloak is mainly – I think it could have a very important application in the military. As for civilian applications I think probably for entertainment but that's still far from what we can get right now so currently the invisibility cloak is only, you know, just like I said before, it's only for the nano scale or for the macro scales; so very small. So in the future, yeah, I hope in the future maybe one decade or a hundred years, people may achieve something that they can cloak a human body or something much bigger.

The University of Birmingham is one of the most prestigious universities in the world; so all the faculties, all the academic staff are highly intelligent, they are very enthusiastic about their research. On top of that the graduate students of the University of Birmingham are very high quality so our future research really depends on the highly motivated graduate students to help us to achieve our research goal in the future. I hope that more and more students will be inspired by our research and become more interested in science and technology.

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