From: Stephen Jordan
To: Liu, Yi-Kai (Fed); Slattery, Oliver T. (Fed)
Subject: Re: question about Quantum Communications applications
Date: Thursday, March 16, 2017 1:16:22 PM
Attachments: 93056_Quantum Manifesto_WEB.pdf
InnovateUK_QuantumTech_CO004_final.pdf
Quantum_Info_Sci_Report_2016_07_22 final.pdf
gs-16-18-quantum-technologies-report.pdf

I have attached a few reports that I know about, outlining potential applications for quantum technologies, including quantum communications, and giving some investment estimates. Also, the economist has recently published an article on this topic which includes some data from a McKinsey analysis of the quantum technology market, which many people are aware of, but which is hard to get one's hands on.

http://www.economist.com/technology-quarterly/2017-03-09/quantum-devices

Best regards,

Stephen

On 03/10/2017 02:31 PM, Liu, Yi-Kai (Fed) wrote:

> Hi Oliver,
>
> I'm sorry for not replying earlier, this week is pretty busy. It sounds like you are looking for ITL-specific applications of quantum communications (and not quantum computing more generally). I think you already got most of the things I would have suggested, but here are a few more ideas:
>
> - Device-independent key distribution and random number generators. (In some sense, these are applications of the loophole-free Bell test.)
>
> - Relativistic bit-commitment (https://arxiv.org/abs/1411.4917) -- actually this is a classical protocol, but it seems quite related to quantum communications.
>
> - Quantum protocols for Byzantine agreement (http://dl.acm.org/citation.cfm?id=1060662)
>
> - Quantum protocols for multiparty computation (https://arxiv.org/abs/0711.2895)
>
> - Position-based quantum cryptography (https://arxiv.org/abs/1009.2490)
>
> - Interferometric telescopes using quantum repeaters (https://arxiv.org/abs/1107.2939)
>
> I hope this helps! Let me know if you need anything else...
>
> Cheers,
>
> --Yi-Kai
>
> _____
> From: Slattery, Oliver T. (Fed)
> Sent: Wednesday, March 8, 2017 2:12:44 PM
> To: Jordan, Stephen P (Fed); Liu, Yi-Kai (Fed)
> Subject: question about Quantum Communications applications
>
> Hello Steven and Yi-Kai,

I am trying to identify the applications within Quantum Information Science that is of interest to ITL such as quantum communications (as opposed to the more general quantum information processing, quantum mechanics or quantum physics). I can think of a few obvious examples such as security (QKD) or connecting quantum computers separated by long distances (quantum repeater). I did read the Advancing Quantum Information Science report (which at least you, Steven, contributed to) and have noted quantum finger-printing, and unforgeable money. I imagine you could add banking (but that is basically QKD).

I am looking for some input form you about any other applications for quantum communications that is particularly interesting in an ITL context. I would greatly appreciate if you could send me any ideas you have on this.
Best,
Ollie S.