**北京邮电大学**

**科学技术发展研究院**

科研院通【2017】45号

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推荐北京市科学技术奖候选项目公示-2

我单位推荐下列项目申报 2017 年度北京市科学技术奖，特进行公示。公示期：2017年3月15日至2017年3月23日，公示期内如对公示内容有异议，请您向 北京邮电大学科研院成果管理办公室 反映。

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**一、项目名称：**多维度光信号的低噪放大及灵活信号处理

**二、候选单位：**北京邮电大学

**三、候 选 人：** 1.忻向军；2.刘 博；3.张丽佳；4.张 琦；5.王拥军；6.田清华

**四、项目简介：**

当前的超高速超长距离光传输系统的速率已经逼近单光纤100Tb/s，随着速率的提升，原有的通信模型已经不适用于当前的传输环境。光信号的宽带化、预处理等需求使得当前的数模/模数转换器等电子设备捉襟见肘；而解决万公里无电中继的传输链路对原有的放大机制提出了严峻的挑战，传统的EDFA已经不适用于当前的超长距离传输系统；相干光系统中所面临的相位噪声与非线性相位畸变也严重的制约了系统的发展，所以需要更灵活的信号处理机制，以最低的复杂度达到最大的均衡效果。项目组针对这些技术难点与重点，展开研究，主要研究内容如下。

1.项目组研究新型的全光信号产生理论。取得了如下发现点：提出了基于光子集成 InP 光调制器的灵活多维度全光信号产生理论。科学价值：打破了 DAC 和电 FPGA 的限制，减轻离散组件的复杂性，降低器件成本，提高了信号速率。

2.项目组研究通过拉曼放大以及参量放大实现全光信号的宽带、底噪放大。取得了如下发现点：项目组提出了用来分析喇曼光纤放大器时域特性的“不完全场分析方法”的数学模型，提出了简单叠加数值计算法确定多个泵浦源的波长与功率的方法。项目组建立了完善的参量放大理论模型和实验系统，实现了系统的无串扰放大。

项目组提出动态灵活的信号处理机制，通过相位连续追踪和子载波直接的迭代编码，实现低复杂度、灵活可靠的信号均衡处理算法。尤其是针对高速相干光传输系统，有效的克服了系统中的相位噪声和非线性相位畸变。

**五：相关证明材料：**

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| **代表性论文、著作发表情况（限10篇）** | | | | | **检索机构** | |  | | | | | |
| 序号 | 论文（著作）名称 | 刊名/出版社 | 影响因子 | 发表时间（年月日） | 通讯作者 | 第一作者 | 论文全部作者 | SCI他引次数 | EI他引次数 | 他引总次数 | 年卷期页码 | 是否国内完成 |
| 1 | OFDM Modulated WDM-ROF System based on PCF-Supercontinuum | OPTICS EXPRESS | 3.148 | 2010.7.5 | Zhang Lijia | Zhang Lijia | Zhang Lijia；  Xin Xiangjun；  Liu Bo；  Wang Yongjun；  Yu Jianjun；  Yu Chongxiu | 9 | 37 | 46 | 2010,18(14) ,15003-15008 | 是 |
| 2 | A Novel MAMSK-OFDM Technology for Next-Generation Optical Access Networks | IEEE PHOTONICS TECHNOLOGY LETTERS | 1.945 | 2011.1.1 | Zhang Lijia | Zhang Lijia | Zhang Lijia；  Xin Xiangjun；  Liu Bo；  Zhang Qi；  Yu Jianjun；  Chi Nan；  Yu Chongxiu | 4 | 9 | 13 | 2011, 23(1):60-62 | 是 |
| 3 | Dynamic lambda-OFDMA with selective multicast overlaid | OPTICS EXPRESS | 3.148 | 2011.4.11 | Xin, Xiangjun | Xin, Xiangjun | Xin Xiangjun；  Zhang Lijia；  Liu Bo；  Yu Jianjun | 17 | 19 | 36 | 2011,19(8):7847-55 | 是 |
| 4 | Performance investigation and demonstration of colorless upstream transmission in ECDM-OFDM-PON | OPTICS EXPRESS | 3.148 | 2011.7.18 | Liu Bo | Liu Bo | Liu Bo；  Xin Xiangjun；  Zhang Lijia；  Yu Jianjun | 5 | 16 | 21 | 2011,19(15):14542-14548 | 是 |
| 5 | Physical-enhanced secure strategy in an OFDM-PON | OPTICS EXPRESS | 3.148 | 2012.1.30 | Zhang Lijia | Zhang Lijia | Zhang Lijia；  Xin Xiangjun；  Liu Bo；  Yu Jianjun | 5 | 9 | 14 | 2012, 20(3):2255 | 是 |
| 6 | Constellation-masked secure communication technique for OFDM-PON | OPTICS EXPRESS | 3.148 | 2012.10.22 | Liu Bo | Liu Bo | Liu Bo；  Zhang Lijia；  Xin Xiangjun；  Yu Jianjun | 4 | 7 | 11 | 2012, 20(22):25161-25168. | 是 |
| 7 | Symmetric Terabit WDM Pre-DFT OFDM access network using PCF-supercontinuum | OPTICS EXPRESS | 3.148 | 2012.10.22 | Liu Bo | Liu Bo | Liu Bo；  Zhang Lijia；  Xin Xiangjun；  Yu Jianjun | 2 | 3 | 5 | 2012, 20(22):24356-63 | 是 |
| 8 | Physical secure enhancement in optical OFDMA-PON based on two-dimensional scrambling | OPTICS EXPRESS | 3.148 | 2012.12.10 | Zhang Lijia | Zhang Lijia | Zhang Lijia；  Xin Xiangjun；  Liu, Bo；  Yin Xiaoli | 4 | 4 | 8 | 2012, 20(26):32-7. | 是 |
| 9 | Theory and Performance Analyses in Secure CO-OFDM Transmission System Based on Two-Dimensional Permutation | JOURNAL OF LIGHTWAVE TECHNOLOGY | 2.567 | 2013.1.1 | Zhang  Lijia | Zhang  Lijia | Zhang Lijia；  Liu Bo；  Xin Xiangjun；  Zhang Qi；  Yu Jianjun；  Wang Yongjun | 4 | 2 | 6 | 2013, 31(1):74-80. | 是 |
| 10 | Physical Layer Security in OFDM-PON Based on Dimension-Transformed Chaotic Permutation | IEEE PHOTONICS TECHNOLOGY LETTERS | 1.945 | 2014.1.15 | Liu Bo | Liu Bo | Liu Bo；  Zhang Lijia；  Xin Xiangjun；  Wang Yongjun | 5 | 6 | 11 | 2014,26(2):127-130. | 是 |

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| 代表性论文、著作被他人引用情况（限10篇） | | | | |
| **序号** | **被引代表性论文、著作序号** | **引文名称/引文作者** | **刊名/影响因子（引文）** | **引文发表时间（年月日）** |
| 1 | OFDM Modulated WDM-ROF System based on PCF-Supercontinuum | Dispersive-wave-based octave-spanning supercontinuum generation in InGaP membrane waveguides on a silicon substrate / Dave Utsav D.; Ciret Charles; Gorza Simon-Pierre; Combrie Sylvain; De Rossi Alfredo; Raineri Fabrice; Roelkens Gunther; Kuyken Bart | OPTICS LETTERS/3.040 | 2015.8.1 |
| 2 | OFDM Modulated WDM-ROF System based on PCF-Supercontinuum | All optical multi-wavelength single-sideband modulated WDM radio-over-fiber systems by introducing a Sagnac loop filter / Wang Yiqun; Pei Li; Li Jing; Li Yueqin | OPTICAL FIBER TECHNOLOGY/1.600 | 2016.12.1 |
| 3 | OFDM Modulated WDM-ROF System based on PCF-Supercontinuum | Flatly broadened supercontinuum generation in dispersion-flattened photonic crystal fibre using compressed picosecond pulses/ Jing Qi; Zhang Xia; Ma Huifang; Huang Yongqing; Ren Xiaomin | JOURNAL OF OPTICS/1.847 | 2012.1.1 |
| 4 | Dynamic lambda-OFDMA with selective multicast overlaid | SSBI mitigation at 60GHz OFDM-ROF system based on optimization of training sequence/ Wang Xin; Yu Jianjun; Cao Zizheng; Xiao J.; Chen Lin | OPTICS EXPRESS/3.148 | 2011.4.25 |
| 5 | Dynamic lambda-OFDMA with selective multicast overlaid | SSMI cancellation in direct-detection optical OFDM with novel half-cycled OFDM/ Li Fan; Cao Z.; Yu Jianjun; Li Xinying; Chen Lin | OPTICS EXPRESS/3.148 | 2013.11.18 |
| 6 | Dynamic lambda-OFDMA with selective multicast overlaid | Metro-access integrated network based on optical OFDMA with dynamic sub-carrier allocation and power distribution/ Zhang Chongfu; Zhang Qiongli; Chen Chen; Jiang Ning; Liu Deming; Qiu Kun; Liu Shuang; Wu Baojian | OPTICS EXPRESS/3.148 | 2013.1.28 |
| 7 | Dynamic lambda-OFDMA with selective multicast overlaid | OFDM RF power-fading circumvention for long-reach WDM-PON/ Chow C. W.; Yeh C. H.; Sung J. Y. | OPTICS EXPRESS/3.148 | 2014.10.6 |
| 8 | Performance investigation and demonstration of colorless upstream transmission in ECDM-OFDM-PON | Ultra-Dense, Single-Wavelength DFT-Spread OFDMA PON With Laserless 1.2 Gb/s ONU Ready for Silicon Photonics Integration/ Schindler P. C.; Agmon A.; Wolf S.; Bonk R.; Meder L.; Meltsin M.;Ludwig A.; Schmogrow R.;Dreschmann M.;Meyer, J. | JOURNAL OF LIGHTWAVE TECHNOLOGY/2.567 | 2015.4.15 |
| 9 | Physical-enhanced secure strategy in an OFDM-PON | Secure passive optical network based on chaos synchronization/ Jiang Ning; Zhang Chongfu; Qiu Kun | OPTICS LETTERS/3.040 | 2012.11.1 |
| 10 | Constellation-masked secure communication technique for OFDM-PON | Secure OFDM-PON System Based on Chaos and Fractional Fourier Transform Techniques/ Deng Lei; Cheng Mengfan; Wang Xiaolong; Li, Hao; Tang, Ming; Fu, Songnian; Shum, Ping, Liu, Deming | JOURNAL OF LIGHTWAVE TECHNOLOGY/2.567 | 2014.8.1 |

公示单位：北京邮电大学

2017年 3月15日