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(54) **OPTICAL NETWORK DEFRAGMENTATION UTILIZING MIXED INTEGER LINEAR PROGRAMMING APPROACHES**

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(57) **ABSTRACT**

The present disclosure provides systems and methods for operating optical networks and performing defragmentation operations. Embodiments include computer systems and computer program products comprising a computer readable storage and a processor. Upon receiving information indicative of a spectrum assignment on the optical network, a target entity associated with a set of optical channels and a potential spectrum path are identified. The target entity can be defragmented to enable the potential spectrum path, comprising reconfiguring at least one existing spectrum path associated with an optical channel in the set of optical channels. The potential spectrum path may then be reconfigured to a continuous and contiguous band of slice on at least one optical channel associated with the target entity.