7. The multi-channel coherent transceiver of claim 1 or any other preceding claim, wherein the second package further comprises a semiconductor optical amplifier (SOA), wherein the tunable laser array is on a first chip and the SOA is on a second chip, and wherein the SOA has a separate submount aligned with the tunable laser array.

8. The multi-channel coherent transceiver of claim 1 or any other preceding claim, further comprising a thermoelectric cooler coupled to the tunable laser array.

9. The multi-channel coherent transceiver of claim 1 or any other preceding claim, wherein the first package is not coupled to a thermoelectric cooler.

10. The multi-channel coherent transceiver of claim 1, wherein both the ASIC and the multi-channel transmitter or receiver PIC are made in silicon.

11. The multi-channel coherent transceiver of claim 1 or any other preceding claim, wherein the multi-channel transmitter or receiver PIC is adjacent to an edge of the ASIC containing one or more digital-to-analog converters (DACs).