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Charged excitons and biexcitons bound to isoelectronic centers GABRIEL ETHIER-MAJCHER, STEPHANE MARCET, CLAUDERIC OUELLET-PLAMONDON, PHILIPPE ST-JEAN, Ecole Polytechnique de Montreal, REGIS ANDRE, Institut Neel, CEA/CNRS/Universite Joseph Fourier, Grenoble, France, JOHN F. KLEM, Sandia National Laboratory, Albuquerque, New Mexico, SEBASTIEN FRANCOEUR, Ecole Polytechnique de Montreal — We demonstrate that isoelectronic centers formed from two isoelectronic traps can bind, in addition to the well-studied excitons, various number of positive and negative charges. Two different systems are studied by microphotoluminescence: 1) tellurium dyads in ZnSe forming hole traps and 2) nitrogen dyads in GaAs forming electron traps. By analyzing their emission fine structure, polarization and diamagnetic shifts, we establish that Te and N dyads can bind, respectively, positively and negatively charged excitons. Using the power dependence of the emission intensity, we clearly demonstrate that both systems can also bind biexcitons. This ability to bind various charge configurations, in addition to their very low inhomogeneous broadenings and perfectly defined symmetries, further establishes isoelectronic centers as an interesting alternative to epitaxial quantum dots for a number of applications.

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