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Fermion Pairing and the Scalar Boson of the 2D Conformal Anomaly EMIL MOTTOLA, DANIEL BLASCHKE, Theoretical Division, Los Alamos National Laboratory, Los Alamos, NM 87545 USA, RAUL CARBALLO-RUBIO, Instituto de Astrofísica de Andalucía (IAA-CSIC), Glorieta de la Astronomía, 18008 Granada, Spain — We analyze the phenomenon of fermion pairing into an effective boson associated with anomalies and the anomalous commutators of currents, bilinear in the fermion fields. In 2D the chiral bosonization of the Schwinger model is determined by the chiral current anomaly of massless Dirac fermions. A similar bosonized description applies to the 2D conformal trace anomaly of the fermion stress tensor. For both the chiral and conformal anomalies, correlation functions involving anomalous currents, j_5^m or T^{mn} of massless fermions exhibit a massless boson $1/k^2$ pole, and the associated spectral functions obey a UV finite sum rule, becoming d-functions in the massless limit. In both cases the effective action of the anomaly is non-local, but may be expressed in a local form by the introduction of a new bosonic field, which becomes a bona fide propagating quantum field in its own right. In both cases this is expressed in Fock space by the anomalous Schwinger commutators of currents becoming the canonical commutation relations of the corresponding boson. The Casimir energy of fermions on a finite interval can also be described as a coherent scalar condensation of pairs, and the one-loop correlation function of stress tensors can be expressed as tree diagrams

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