Unexpected Ionization Structure in Eta Carinae's ``Weigelt Knots''

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The Weigelt knots, dense slow-moving ejecta near eta Car, are mysterious in structure as well as in origin. Using spatially dithered spectrograms obtained with the HST/STIS, we have partially resolved the ionization zones of one knot. Contrary to simple models, higher ionization levels occur on the outer side of the knot, i.e., farther from the star. They cannot represent a bow shock, and no satisfying explanation is yet available -- though we sketch one qualitative possibility. STIS spectrograms provide far more reliable spatial measurements of the Weigelt Knots than HST images do, and this technique can also be applied to the knots' proper motion problem. Our spatial measurement accuracy is about 10 mas, corresponding to a projected linear scale of the order of 30 AU which is appreciably smaller than the size of each Weigelt knot.

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