# REIONIZATION BY METAL-POOR STARS

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HUBBLE ULTRA DEEP FIELD

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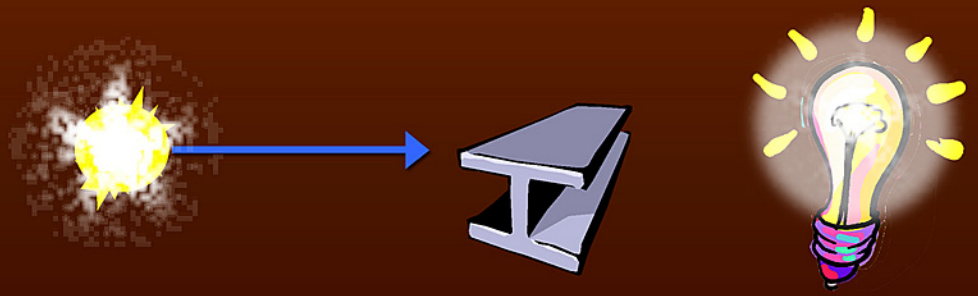
When fusing hydrogen into heavier elements, stars produce both energy and metals.



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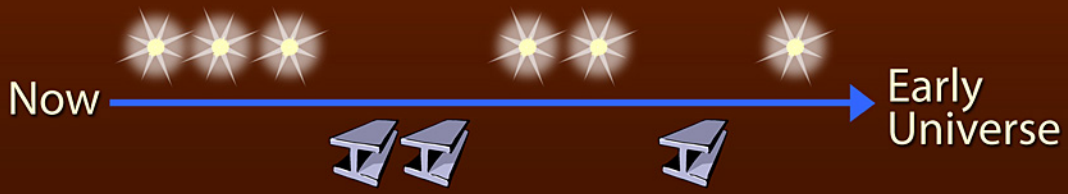
Early in the life of the Universe, when only few generations of stars had been formed, the metallicity of the stars was very low.




Each generation of stars incorporates metals produced by the previous generations.

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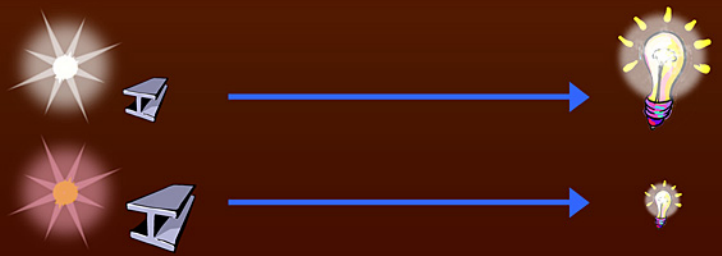
It is possible that stars before reionization were very metal-poor.

Metal-poor stars are hotter and more efficient ionizers.



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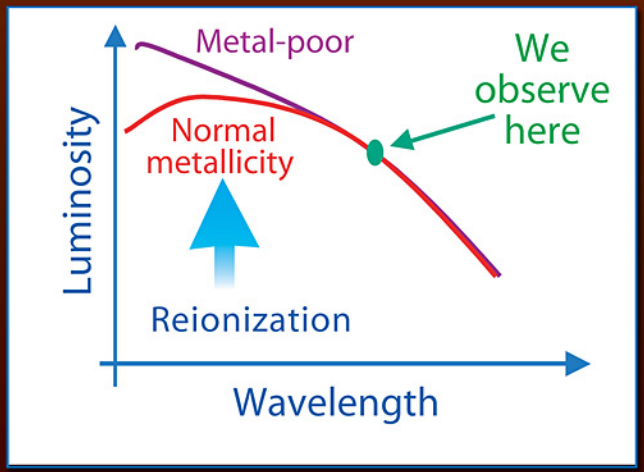
It takes fewer metal-poor stars to reionize the Universe. We are forced to study these objects at longer wavelengths.

This would lead us to underestimate their ionizing flux if we didn't take into account their nature.

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Thus, if the galaxies at z=6 that we detect in the UDF are metal-poor, they might be sufficient to reionize the Universe.

How can we tell whether this is the case?

— If we do not observe (with NICMOS or WFC3) many galaxies at z>6, reionization must have been done by galaxies at z=6.

— JWST will be able to measure these galaxies' metallicity.

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