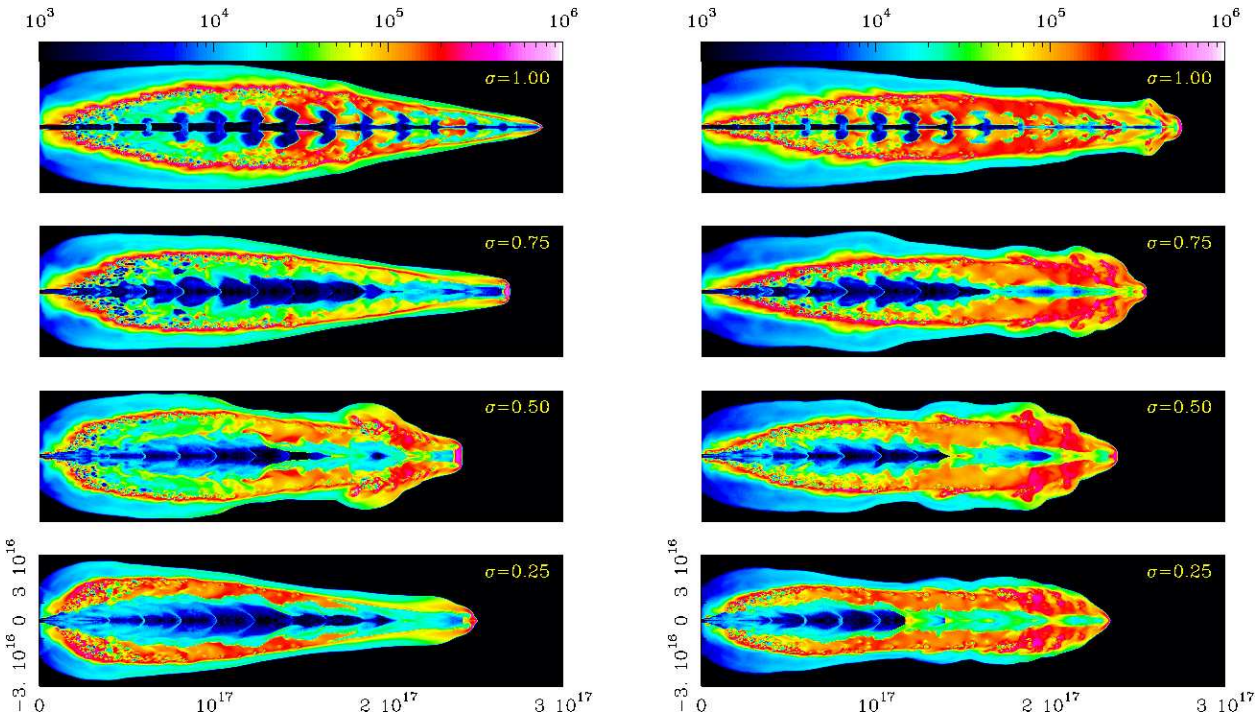

Fig. 2. Temperature stratifications obtained from the single-sinusoidal mode variable jet models (see § 3). The models of jets moving into an environment with $n_a = 15$ cm^{-3} are shown at a $t = 350$ yr integration time (left column) and the models with $n_a = 100$ cm^{-3} are shown at $t = 400$ yr (right column). The results are labeled with the value of σ (the edge-to-center ejection velocity ratio) of each model. The temperatures are depicted with the logarithmic color scheme given (in K) by the top bar. The color figure can be viewed online.

aries of the $(30, 3.75) \times 10^{16}$ cm (axial $\times$ radial) computational domain.

The density and temperature stratifications obtained from the four $n_a = 15$ cm^{-3} models after a $t = 350$ yr time-integration and the four $n_a = 100$ cm^{-3} models at $t = 400$ yr are shown in Figures 1 and 2. The models show a leading jet head and a series of travelling "internal working surfaces" (IWS) which are formed as a result of the ejection time-variability.

We first note that the knots within $\approx 10^{17}$ cm from the source have very similar structures in the $n_a = 15$ and 100 cm^{-3} models. From this, we conclude that the precise value of the environmental density does not have a strong effect on the sequence of knots close to the outflow source (see Figures 1 and 2). It is clear, however, that the value of n_a does have (as expected) an important effect on the structure and propagation of the leading head of the jet.

On the other hand, it is clear from Figures 1 and 2 that the value chosen for the edge-to-center ejection velocity ratio σ does have a strong effect on the structure of the IWS. For $\sigma = 1$, the working surfaces have compact, dense regions within the jet beam, which eject low density material out into the cocoon of the jet. For lower values of σ, the IWS have clear, bow-shaped morphologies, with densities that fall away from the symmetry axis (see Figure 1).

The value of σ also has a strong effect on the resulting temperature stratifications. For $\sigma = 1$, a relatively hot cocoon (with $T \sim 3 \rightarrow 20 \times 10^4$ K) is in contact with the jet beam. For lower values of σ, a lower temperature region (with $T \sim 10^4$ K) buffers the jet beam from the hot cocoon (this cool region is most clearly seen in the $\sigma = 0.25$ model, see Figure 2).

In Figure 3, we show the [S II] 6716+6730 emission maps predicted from the four $n_a = 15$ cm^{-3} models for $t = 350$ yr. These maps have been computed solving the appropriate 5-level atom problem, and integrating the resulting emission coefficient along lines of sight. It has been assumed that the outflow axis lies on the plane of the sky.

The maps shown in Figure 3 display the region close to the outflow source. It is clear that for $\sigma = 1$ the emission from the IWS is concentrated in compact "knots", with only very faint "wings" seen in