Wobble Power Modulation in IPGScan

Purpose

The purpose of this reference document is to show how to use the new wobble power modulation feature in IPGScan. This document will refer mostly to circle wobble type, but the discussion and the parameters are also applicable to other wobble modes.

Equipment and Software

1. ScanPack with version higher than 0.1.14913
2. IPGScan with version higher than 1.0.0.14937
3. Scan Controller image with version higher than 3.7.1

Introduction

The Wobble Power Modulation is simply a compensation on the laser power control signal on each wobble cycle. The idea behind it to decrease (or increase) the laser power in areas where there may be an overlap of laser energy due to the wobble movement.

Three parameters are available (along with all other standard wobble parameters): Edge, Offset and Forward. Each will be explained below.

The wobble power modulation is part of the wobble parameter section in IPGScan (when IPGScan is working in weld mode) and is not enabled by default.

In order to enable it, wobble must be enabled for a particular weld, a wobble type selected, and "Modulation On/Off" must be set to True.

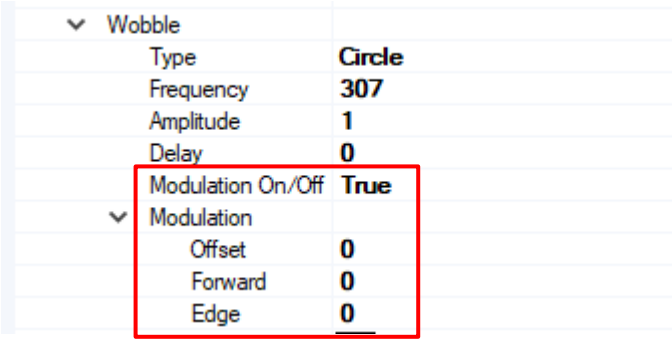

Figure 1 – Wobble Power Modulation parameters in IPGScan

Definition of terms

The discussion of this feature assumes the following definition for the beam movement during a wobble cycle

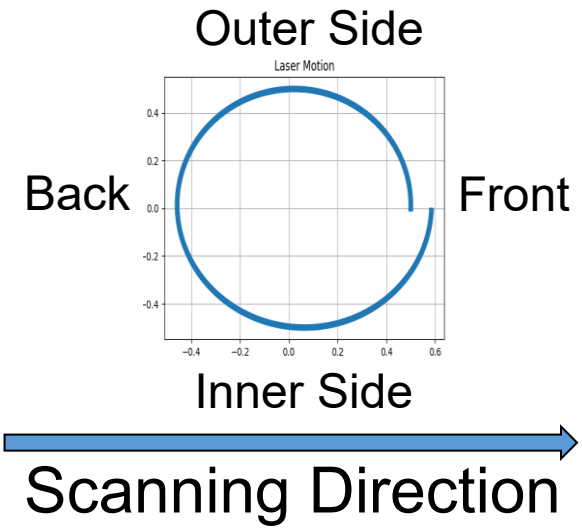

Figure 2 – Definition of wobble cycle terms used in this document

Modulation Parameters

Edge

The edge parameter can be set anywhere from 0 to 1. This parameter reduces the power at the sides of the wobble cycle (by the same amount).

For example, a value of 0.1 reduces the power on each side by 10%. A value of 1.0 would reduce the power by 100%.

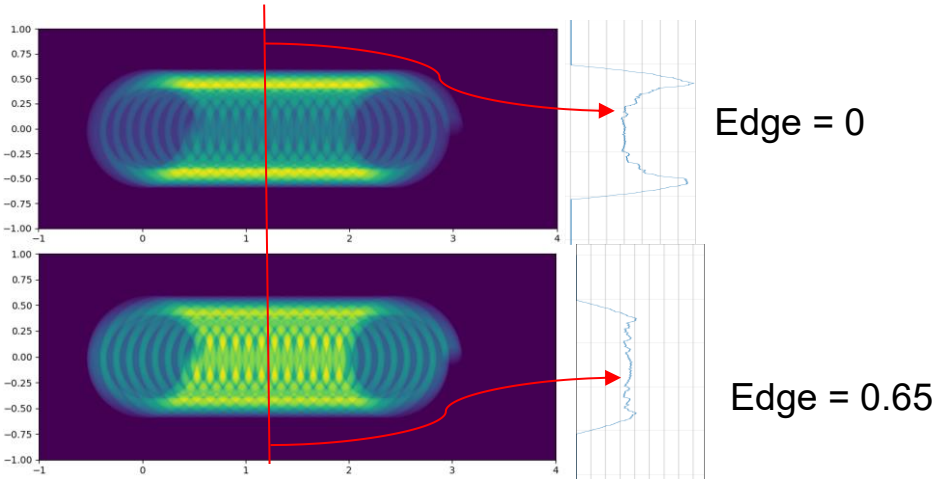

Figure 3 – Heat Map of wobble weld with different Edge parameter values

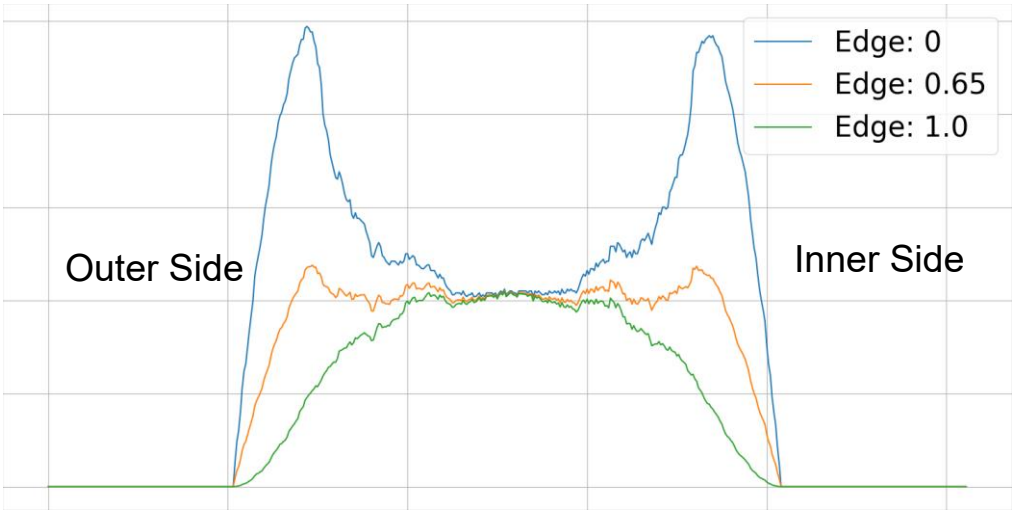

Figure 4 - Simulated cross section of weld with different Edge values

Offset

The offset parameter can be set anywhere from -1 to 1. This parameter reduces the power at one side of the wobble cycle, while increasing on the other. Adding a negative sign reverses the side power is decreased/increased.

For example, a value of 0.1 (or -0.1) increases the power on one side by 10%, while decreasing the other by 10%

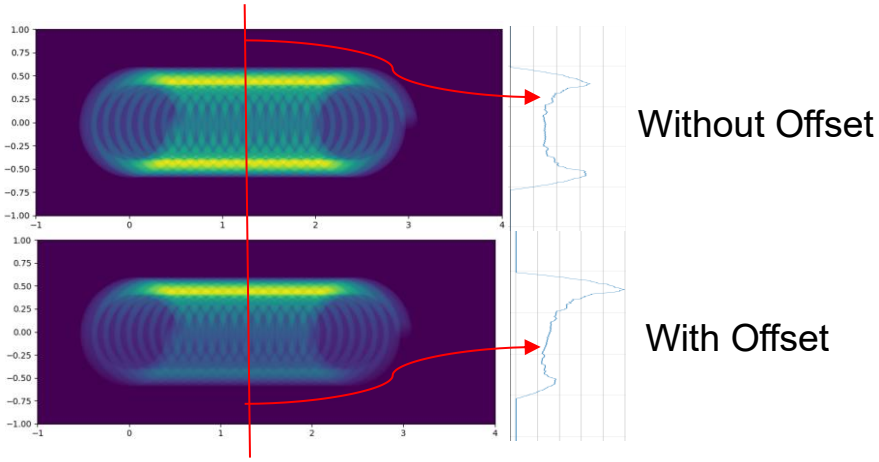

Figure 5 – Heat Map of wobble weld with different Edge parameter values

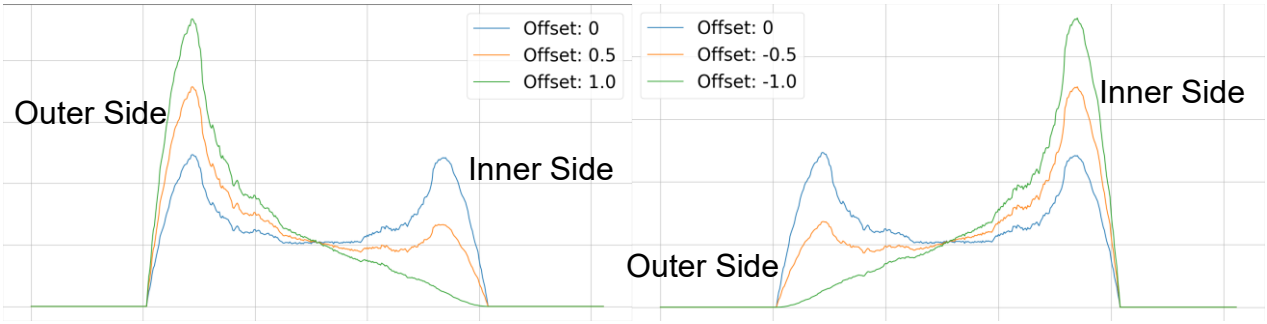

Figure 6 - Simulated cross section of weld with different Offset values

Forward

The forward parameter can be set anywhere from -1 to 1. This parameter reduces the power at the back of the wobble cycle, while increasing on the front (or vice versa depending on the sign). Adding a negative sign reverses the side power is decreased/increased.

For example, a value of 0.1 (or -0.1) increases the power on the front by 10%, while decreasing the back by 10%

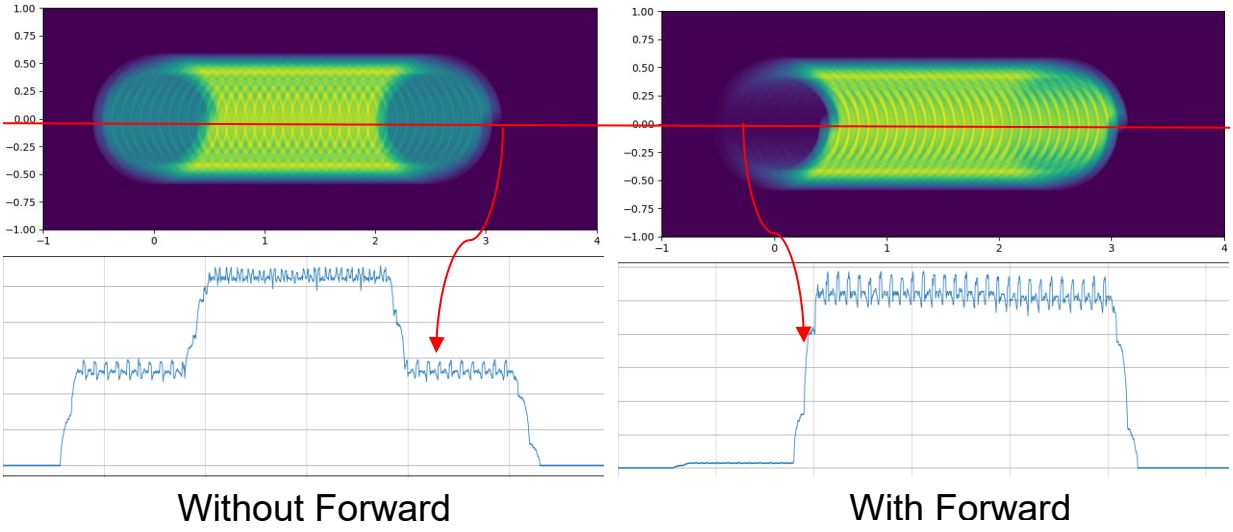

Figure 7 – Heat Map of wobble weld with different Forward parameter values

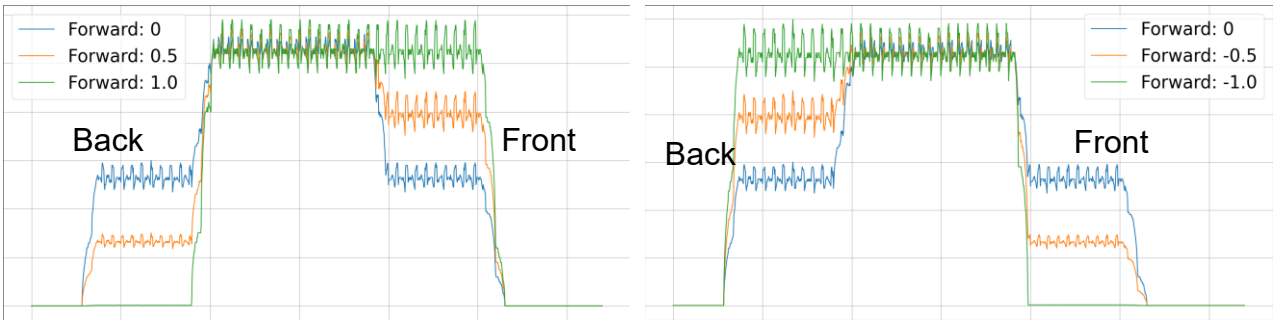

Figure 8 - Simulated cross section of weld with different Forward values